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CONTENTS AND DIGEST

Dermatology and Associated Disorders of the Mucous Membranes. O. H. Foerster, M.D., Milwaukee.....653

Paucity of literature on affections of mucous membrane. Clinical features of lichen planus. Lupus erythematosus. Confusion with syphilis. Other affections producing lesions. Geographic tongue. Moeller's glossitis. Vincent's disease.

Accessory Nasal Sinuses of Children. Seymour Oppenhemier, M.D., New York 656

Sinusitis in the child. Development of the sinuses. Importance of cells. Frontal and sphenoidal sinuses. Recognition of sinusitis. Involvement due to infectious disease. Drainage. Bacteriology. Staphylococci as infecting organisms. Effect on rabbits. The diagnosis of sinus affections. Close relationship to other local infections. Purulent sphenoidal sinusitis. First measures in treatment. Operative procedure. Other methods.

Discussed by Drs. Kerley, McTiernan, Mayer, Thomson, Voorhees, McKenzie, Dean and Oppenheimer.

The Analysis of Human Milk: Technic of Obtaining Samples and Interpretation of Results. Fritz B. Talbot, M.D., Boston 662

Sources of error in analysis of human milk. Time of day when drawn. Method of collecting samples. Inaccurate methods of analysis. How analysis may aid one clinically.

Discussed by Drs. Foote, Love and Talbot.

Anomalies of Tuberculosis in the Highlands of Colombia: A New Diagnostic Sign in Incipient Cases. Jorge Vargas S., M.D., New York.....664

Character of the country and its invasion by tuberculosis. Former rarity of tuberculosis. Special characteristics of the disease since its invasion. Tuberculous meningitis. Miliary tuberculosis. Chronic pulmonary tuberculosis. A new sign for the early diagnosis of incipient pulmonary tuberculosis.

Clinical Diagnosis as Compared with Necropsy Findings in Six Hundred Cases. Edward T. Karsner, M.D.; Leonard Rothschild, M.D., and E. S. Crump, M.D., Cleveland.....666

Modern advances in clinical medicine. Cabot's article on diagnostic pitfalls and its effects. Study of 600 cases in two large hospitals in Cleveland. Minor errors and gross errors. Value of the necropsy.

Discussed by Drs. Wood, MacCarty, Le Count, Albert, Coplin, Robertson and Karsner.

Experiences with Duodenal Feeding at U. S. Army General Hospital No. 41. Jacob Buckstein, M.D., Fox Hills, Staten Island, N. Y.....670

Class of patients treated. Modification of duodenal tube. The drop method of feeding. Use of roentgenogram for location of tube. Obstacles to the proper flow of fluid. Special points as to material, length of time used, etc.

Arachidic Bronchitis. Chevalier Jackson, M.D., and William H. Spencer, M.D., Philadelphia 672

Selection of the term. Diagnosis of condition. Etiology. Pathology. Treatment of peanut bronchitis. Analysis of some recent cases. Report of cases.

Discussed by Drs. Graham, Hubbard, Murphy, Mosher, Turck, Thomson and Jackson.

(Continued on next page)

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SAUNDERS, *Publishers*

See Page 3

CONTENTS AND DIGEST—Concluded

Gangrene Following Carbon Monoxid Poisoning. J. Emmons Briggs, M.D., Boston 678

Report of case. Previous cases in literature.

The Surgical Treatment of Typhoid Carriers. H. J. Nichols, M.D.; J. S. Simmons, M.D., and C. O. Stimmel, Washington, D. C. 680

Material used. Control of communicable diseases. Report of cases. Results of examinations for typhoid bacilli. Underlying principle of surgical treatment of typhoid carriers.

Mustard Gas. E. K. Marshall, Jr., M.D., Baltimore.....684

Chemical nature of mustard gas. Difficulty of determining toxicity. Extreme toxic effect. Symptoms and systemic effects. Chemical change and mechanism. Susceptibility and resistance.

Poisoning with the Lethal War Gases: Physiology and Experimental Treatment. Frank P. Underhill, Ph.D., New Haven, Conn......686

Gases employed and their effects. Stages in phosgen poisoning. An interpretation. Cause of death. Treatment.

Chronic Lesions of the Respiratory Tract Initiated by the Inhalation of Irritating Gases. M. C. Winternitz, M.D., New Haven, Conn......689

Action of the gases on the respiratory tract. Mustard gas, chlorin, phosgen and their effects.

Papers of Drs. Marshall, Underhill and Winternitz discussed by Drs. Pappenheimer, Le Count, Coplin, Robertson, Wood, Marshall and Underhill.

NEW AND NONOFFICIAL REMEDIES

Description of Articles Accepted by the Council on Pharmacy and Chemistry 691

Colon Bacillus Vaccine — Gonococcus Vaccine — Mixed Bacterial Vaccines — Pertussis Bacillus Vaccine — Staphylococcus Vaccines—Streptococcus Vaccine — Typhoid Vaccine — Tetanus Antitoxin, Concentrated.

EDITORIALS

Leonardo Da Vinci as Anatomist (1452-1519).....692

One of the most versatile and original of investigators.

Are the Capillaries Contractile?....693

New evidence that these minute vessels constantly perform active changes in caliber.

Fever and the Water Reserve: A Physicochemical Theory.....693

Experimental work that may lead to important advances in the treatment of febrile diseases.

The Metabolism of Bile Acids.....694

Uncertainty with regard to the origin and physiology of the bile constituents.

CURRENT COMMENT

Anthrax 695

Belief that the increase in anthrax cases is due to the disturbance of the usual channels of import.

Early Awards of the War Risk Insurance Bureau.....696

An analysis of the causes of disability.

The Carrier Problem in Meningitis..696

The need of uniform legislation with respect to carriers.

Report of Health Insurance Commission of the State of Illinois.....696

A valuable study of medical sociological problems.

MEDICAL MOBILIZATION AND THE WAR 697

Honorable Discharges, Medical Corps, U. S. Army.

MEDICAL NEWS 699

MARRIAGES 706

DEATHS 706

PROPAGANDA FOR REFORM 707

S. S. S.

CORRESPONDENCE 709

Sir Walter Scott's Lameness.
"The Administration of Arsphenamin."
Stethoscope or Stethophone or Otherwise.
Centenary of the Stethoscope.

QUERIES AND MINOR NOTES 711

Health Status and Health Peculiarities of the Jewish Race.
The Coefficient of Robustness.
Elimination of Ants.

MEDICAL EDUCATION AND STATE BOARDS OF REGISTRATION

Coming Examinations — Idaho April Examination—Utah April Examination—Arkansas May Examination — Hawaii May Examination — Nevada May Examination 711

BOOK NOTICES 712

MEDICOLEGAL

Mental Capacity Required to Transact Business —Misrepresentations by Applicants for Insurance — Correct Practice Relative to Expert Testimony — Liability of Husband for Medical Services to Wife 713

SOCIETY PROCEEDINGS 714

Coming Meetings.
American Society for Clinical Investigation.
Association of American Physicians.
American Orthopedic Association.

CURRENT MEDICAL LITERATURE

American Medical Journals

Circulatory Failure Due to Epinephrin — Oxygen Consumption in Feeding and Starvation — Intraspinal Therapy in Neurosyphilis 718

Syphilis of Digestive Tract — Pneumonias Following Injection of Arsenobenzol — Immunity in City Bred Recruits—Influenza—Tuberculosis and Irritable Heart — Extract Nitrogen in Tissues — A Neurologic Syndrome 719

Formation of Single Ovum Twins — Changes in Skin Sensitiveness to Tuberculin During Epidemic Influenza — Hemorrhage Into Postscarlatinal Cervical Abscess — Analysis of Cerebrospinal Fluids of Cats with Meningeal Infections — Treatment of Hay-Fever by Alcoholic Injection—Paralysis of Glossopharyngeal, Pneumogastric and Spinal Accessory Nerves with Cerebellar Symptoms..720

Effect of Agglutinins — Hemolytic Complement and Antibodies — Nature of Eclampsia —Production of Antihuman Hemolysin — Apical Tuberculosis and Orthograde Posture — Neurocirculatory Asthenia 721

Retention of Habits by Rat After Partial Decerebration — Action of Opium on Psychologic Reaction Time — Cerebral Motor Control — Cerebral Function in Partially Decerebrated Rats 722

Foreign Medical Journals

Tuberculosis and Ministry of Health.—Hospitals for Tuberculosis—Eclampsia—Ankylostomiasis in London — Etiology of Cholera—Traumatic Rupture of Intestine—Expectation of Life in Tuberculosis.....723

Lymphoidocyte and Its Clinical Significance—French Contributions to Obstetrics—Medical Abortion—Jaundice Secondary to Influenza—Cardiovascular Symptoms in the Gassed — Osteogenesis After Wounds of the Head—Horizontal Displacement with Fracture — Evacuation Surgery—Dermatographic Pencil 724

War Wound of the Kidney—Walking Treatment of Fracture of the Leg—Regeneration of Bone—Biologic Laws Governing Implants —Pernicious Anemia of Infectious Origin—Normal Alimentary Glycosuria—Diet in Nephritis—Auscultation of Venous Pulse—Cancer of Body of the Uterus—Roentgen Examination of Tuberculosis Suspects—Electric Treatment of Degenerated Muscles.....725

Transverse Section of Spinal Cord—Treatment of the Wounded in the War—Cortical Sensory Centers—Pneumococcus Pseudotuberculosis — Transfusion of Blood — Filtrable Viruses 726

Resection of Pylorus — Treatment of Diphtheria—Effects of Radioactivity on the Blood and Blood-Producing Organs.....727

Abortive Treatment of Syphilis — Suprarenal Asthenia—Congenital Pes Varus—Spengler's Immune Bodies in Treatment of Tuberculosis in Children—Signs of Rachitis—Iodids with Hyperthyroidism — Serodiagnosis of Typhus—Medicolegal Report on Murder Case —Subconjunctival Injection of Cocain for Cataract and Glaucoma Operations — Anaphylaxis, Allergy and Treatment — Technic for Cholecystectomy 728

The Surgical Trend in Obstetrics—Classification of Gastro-Intestinal Disorders in Infants—Frequency of Latent Tuberculosis in Children — Preparation of Solutions of Sodium Citrate—Iodin Internally—Milk in Colitis — Bismuth in Treatment of Gastric Ulcer—Diarrhea and Arsenic—Tuberculous Arthritis of the Knee in Children—Thymus Functioning 729

Tetragenus Sepsis—Arrhythmia with Beriberi —Electrocardiographic Study of Action of Drugs on Heart—Multiple Sclerosis—Lumbar Puncture with Abscess in Brain—Acute Leukemia—Influenzal Pneumonia in Parturients 730

TONICS AND SEDATIVES—BOOKS RECEIVED.....Adv. Page 20

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DERMATOLOGY AND ASSOCIATED DISORDERS OF THE MUCOUS MEMBRANES *

O. H. FOERSTER, M.D.

MILWAUKEE

One of the proper and important functions of the dermatologist is the study and interpretation of disorders of the mucous membranes, occurring either as independent manifestations or in association with cutaneous or constitutional disease. By reason of their continuity with the skin and close structural relationship, consideration of the mucous membranes ought logically to be included in a complete dermatologic investigation, a practice more often omitted than observed. The statement that they deserve investigation is particularly applicable to the oral cavity, in which the presence of lesions of the mucous membranes may serve to clarify the diagnosis of accompanying cutaneous disorders, and at times provides the key for the recognition of otherwise obscure conditions of disease.

Compared with the voluminous literature concerning every feature of the cutaneous expression of disease, that dealing with affections of the mucous membranes is disproportionately small and is to a considerable extent incidental in character. Perhaps this is a reflection of the tendency in practice to be uncertain when lesions of the mucous membranes not frankly specific are in question, and to formulate diagnostic conclusions from evidence with which we confess ourselves to be more familiar. In any event, this field offers abundant opportunity for observation and study, the results of which will be welcomed as an important addition to medicine as a whole and to dermatology in particular.

It is not proposed at this time to enter into an extensive discussion of mucous membrane disorders, but rather to point out that the subject warrants greater consideration than has been given it in teaching and practice, and that by inattention to this field much of clinical value fails of proper interpretation or goes unrecognized.

The occurrence of papules and of vesicular and exudative processes in the mucous membranes, resulting in erosions, plaques and ulcerations, is observed as part of the symptomatology of a variety of diseases. Those of especial interest to the dermatologist, aside from syphilis, are the lesions of the mucous membranes which occur in association with disorders classified as typically cutaneous. Represented in this group are lichen planus, erythema multiforme, dermatitis herpetiformis, the three varieties of pemphigus, erythematous lupus, lupus vulgaris, herpes and impetigo herpetiformis, mostly dermatoses of constitutional origin. Involvement of the mucous membranes is of regular occurrence in several of these conditions and may, in fact, precede the cutaneous symptoms or, in rare instances, be the only manifestation of the disease.

CLINICAL FEATURES OF LICHEN PLANUS

Lichen planus presents all of these variations. We are inclined to look on lichen planus as a typical dermatosis, and yet its lesions may be limited entirely to the mucous membranes or may exist there for a long period before the appearance of cutaneous symptoms. The case of solitary lichen planus of the tongue reported by Montgomery[1], and that of lichen planus of the buccal mucosa and tongue in a child, as recorded by Sainton and Burnier,[2] are instances of this unusual limitation. A tabulation made by Trautman (as quoted by Montgomery[1]) of 157 cases of lichen planus of the mucous membranes, shows that the skin was primarily affected in fourteen cases, coincidentally affected in ninety-four, subsequently affected in nineteen, and that in twenty-six instances the mucous membrane lesions existed alone. In these 157 cases, the cheeks were affected in 129 instances, the tongue in eighty, the lips in thirty-five, the palate in twenty-seven, the gums in seventeen, the larynx in seven and vulva in six. The striking feature of this tabulation is the high percentage of cases in which the disease affected the mucous membranes exclusively.

Lichen planus of the oral cavity is one of the most accurately studied affections of the mucous membranes and presents fairly distinctive clinical features. Its comparatively frequent occurrence offers at least one reason for attempting to gain proficiency in diagnosis based on symptoms limited to the mucosa. The essential lesion is a papule, appearing as a convex, conical or flattened, hard, whitish-gray dot of pinhead size or smaller, without an inflammatory halo. The papules are either discrete and scattered, or arranged in groups or lines, the latter often forming a rather characteristic meshwork, with nodes at the points of intersection as described by Montgomery.[1] Circinate lesions occasionally develop by reason of the appearance of new papules at the margin of an older group, with involution of the latter, leaving a depressed, smooth, nonstriated, bluish-red center, sur-

* Chairman's address, read before the Section on Dermatology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

1. Montgomery, D. W.: J. Cutan. Dis. **32**: 481 (July) 1914.
2. Sainton and Burnier: Bull. Soc. franc. de dermat. et syph. **22**: 200, 1911.

rounded by a delicate polycyclic border composed of tiny papules. The formation of ring lesions by central involution and peripheral extension of large papules has also been noted. Lieberthal's[3] description of lichen planus as it appears in the oral cavity is concise and accurate. He says:

On the cheeks, lichen planus, as a rule, affects that part which is just opposite the interdental space and presents papules, oval or circular plaques and, most frequently, streaks or linear projections with intervening furrows. These projections are arranged in different ways, parallel to each other, convergent or divergent, passing each other in different directions and forming networks, or stellar or brushlike formations. They all show the character of the elementary papules, are opaline, sharply defined and painless. The lesions of the tongue differ somewhat. On the back they present irregular, oval or circular plaques, while on the upper and lower surfaces of the margins solitary papules are found, or more frequently, irregular or band and stripelike plaques. They are, as a rule, not sharply defined, are smooth, less hard, not raised above the level of the normal surface, not glossy, but dull and grayish white. On the mucous membrane of the lips the papules form irregular plaques, and on the vermilion border groups of irregular plaques. On the soft and hard palates, and on the gums, solitary and aggregated papules are more frequent than plaques or networks. The older the process upon the mucous membranes, the more do the papules coalesce and lose their distinct outlines. The plaques and streaks lose their roughness and hardness, and at last they become so flat that there is no elevation present, but only the shiny, white discoloration resembling mucosa touched with silver nitrate. These lesions show no tendency to degenerative changes; no erosion or ulceration occurs.

The process is indolent and often persistent, and may relapse after its spontaneous disappearance.

In addition to the oral cavity, lichen planus appears also on the vaginal and urethral mucosa, and not infrequently manifests itself on the glans penis.

The clinical features of lichen planus of the mucous surfaces have been presented in considerable detail because of the difficulties at times encountered by the practitioner in differentiating the disease from syphilis. With lesions confined to the mucosa, the diagnostic skill of the expert is put to the severest test, and even with accompanying cutaneous symptoms the situation may prove confusing. Fordyce[4] has pictured the condition thus:

The grouping and distribution of lichen planus of the skin, with its pigment changes, may closely simulate a syphilid, and if at the same time radiating, or parallel, gray or white streaks are seen inside the cheeks, with palmar and plantar papules, and swelling of the inguinal or cervical lymph nodes, the diagnostic difficulties increase. The observer may be still further confused by the absence of itching in lichen planus and its favorable response to mercurial treatment. Consideration in the differential diagnosis of lichen planus and syphilis should be given to the several phases of mucous patches, scars or epithelial changes after the involution of specific lesions, as well as to the specific and nonspecific leukoplasias. Leukokeratosis in individuals who are not smokers, and from whom a syphilitic history cannot be elicited, should suggest the probability of lichen planus, and lead the observer to look for further evidence of that affection.

It has been my experience that lichen planus of the skin, attended with itching, is frequently diagnosed as eczema or scabies by the practitioner. This error can in many instances be avoided by an inspection of the oral mucosa, provided the frequent appearance of lichen planus in this location is borne in mind.

3. Lieberthal, David: Lichen Planus of the Oral Mucosa, J. A. M. A. **48**: 559 (Feb. 16) 1907.
4. Fordyce, J. A.: J. Cutan. Dis. **22**: 405 (Sept.) 1904.

LUPUS ERYTHEMATOSUS

Lupus erythematosus may also be limited to the mucous membranes, either entirely, which is rare, or for a considerable time preceding its appearance on the skin or scalp. Its recognition under these conditions is made more difficult by variations in its clinical appearance dependent on the stage of the process. Dubreuilh,[5] Smith[6] and Kren[7] draw a distinction between the appearance presented by recent and by older lesions of lupus erythematosus as observed on the oral mucosa. Their descriptions of early lesions indicate that the disorder begins as a hyperemic, bluish-red, slightly elevated spot, with indefinite outlines and, at times, a slightly eroded surface. In this stage differentiation from other acute inflammatory lesions is often impossible. Within a few days the lesion undergoes a change, the margins are slightly elevated and more distinct in outline, and delicate vascular striations are observed converging toward the center of the lesion, which is now depressed, eroded, and often covered with an adherent yellowish pellicle.

In a later stage the central erosion increases in depth and is either converted into a thin, flat scar, or is covered with epithelium, with the formation of closely set, bluish-white puncta or striations converging centrally. On the lips the striae may be arranged in parallel lines or in the form of a delicate network. Coincident with the appearance of these whitish striations, the lesion loses its inflammatory character and enters on the stage of atrophy and quiescence. It is not unusual, however, for the lesion again to enlarge by peripheral extension and to show recurrent central erosion at intervals. This description applies especially to patches as they appear on the buccal mucosa, which is the site of predilection.

Kren[7] has given a clear and accurate account of the condition as it is observed on the lips. He says:

The plaques, which may by confluence rapidly involve the entire lip, have the same margins with similar vascular ectasia or similar fine white tracery (as observed on the buccal mucosa). The delicate network of white striae is especially distinct within the margins of lesions on the vermilion of the lip. This is a feature which is observed repeatedly and which has not been given sufficient prominence in descriptions of the affection. The color of the lip is violaceous; the lip is slightly swollen and often everted. As a rule, in recent cases the lip is so heavily covered with scalelike, large, thin, epithelial lamellae and with bloodcrusts, that the details just described are seen only in part or not at all. The lip then presents the appearance, as described by Dubreuilh, of having been painted with collodion which is peeling off. After maceration of the lamellae and crusts, irregular red areas with concave margins may be observed in the violaceous labial mucosa, which is stippled with white dots. Especially noticeable is the readiness with which bleeding of the affected labial mucosa occurs upon slight movement, a condition which is rarely observed in the oral mucosa.

I have had the opportunity to observe during several years an instance of lupus erythematosus, in a young woman, with two lesions on the mucosa of the lower lip.[8] These had been present for more than one year before three additional patches appeared on the scalp, and they still persist long after the disappearance of the scalp lesions. At irregular intervals both lesions on

5. Dubreuilh: Ann. de dermat. et syph., 1901, p. 231.
6. Smith: Brit. M. J. **1**, 1906.
7. Kren, O.: Arch. f. dermat. u. syph. **83**: 13, 1907.
8. Foerster, O. H.: J. Cutan. Dis. **33**: 405, 1915

the lip become edematous, with reddened, elevated margins and central erosion. On subsidence of the inflammation the lesions again assume their indolent form, with slight marginal infiltration and central depression and atrophy.

CONFUSION WITH SYPHILIS

The symptomatology of lichen planus and of lupus erythematosus, as observed in the mouth, has been described in more or less detail because these two disorders may present features requiring differentiation from syphilis. If the lesions appear on the mucous membranes primarily, and especially if they remain limited to the mucosa, the aid in diagnosis which might be afforded by the presence of cutaneous lesions is not available; knowledge of the symptomatology as described will then prove valuable by providing distinguishing data.

While other dermatoses than lichen planus and lupus erythematosus may exhibit lesions of the mucous membranes, these are seldom of such character as to be confused with those produced by syphilis. They are generally of short duration, and in their essential features are reproductions on the mucosa of the coincident cutaneous lesions, modified by location. An exception must be made, however, with respect to erythema multiforme and pemphigus, in which the occasional limitation of lesions to the mucosa and their clinical appearance may simulate the mucous patches of syphilis, and especially in pemphigus vegetans, in which the oral mucosa and perigenital and anal regions may be simultaneously affected. In these diseases the lesions of mucous surfaces will almost invariably present evidence of their vesicular or bullous origin by shreds of epithelium which persist at some part of their margins, though careful examination may be required to reveal them. In addition, these lesions are usually painful, bleed readily, are always superficial and not infiltrated, are surrounded by an inflammatory zone, and may present polycyclic contours by fusion of adjoining lesions. The polycyclic outline and collarette of epithelial shreds are also features which serve to differentiate relapsing herpes of the mouth from mucous patches, as pointed out by Fournier.

OTHER AFFECTIONS PRODUCING LESIONS

The mucous membranes may participate in the symptomatology of a number of other dermatologic conditions, too numerous for detailed discussion at this time. It is well to recall, however, that dermatitis herpetiformis may present lesions on the tongue, lips, cheeks, conjunctiva, prepuce and labia, usually of marked inflammatory nature and attended with burning pain. Urticaria, angioneurotic edema and purpura often involve the mucous membranes of the mouth, nose and alimentary tract. Medicinal agents, especially antipyrin, have been known to produce erosive lesions of the mucosa, and iodin has been responsible for ecchymotic and gangrenous processes. Engmann[9] describes seborrheic eczema as occurring on the conjunctiva, oral mucosa, tongue and introitus vaginae, and also discusses the subject of affections of the mucous membranes in relation to skin diseases in a comprehensive manner. Acanthosis nigricans, made known to us by Pollitzer, affects the lips and mouth with considerable regularity, and impetigo herpetiformis may be preceded by lesions of the oral mucosa.

9. Engmann, M. F.: J. Cutan. Dis. **22**: 412 (Sept.) 1904.

Recently, Mook[10] has described a series of cases of pemphigoid dermatitis following vaccination, several of which presented oral lesions; an allied condition was described by Howe,[11] six out of ten of his cases ending fatally, with marked involvement of the oral mucosa.

Several of the constitutional diseases, scurvy, pellagra, acute leukemia and pernicious anemia, not infrequently affect the mucous membranes, and it may devolve on the dermatologist to establish the diagnosis. Tuberculosis, syphilis, and malignant disease of the mucous membranes, leukoplakia and the mucous membrane lesions occurring in the course of the acute exanthems will only be mentioned here, for their importance in relation to the general subject is so evident as not to require further comment at this time or place.

GEOGRAPHIC TONGUE

There remain three conditions to which, it appears to me, atttention can be directed profitably at this time. One is geographic tongue, wandering rash of the tongue, or exfoliatio linguae areata, regarding which some confusion appears to exist, largely a matter of nomenclature, in my opinion. It is described in most textbooks as a rare disease, occurring chiefly in young children. My experience with this condition may be entirely at variance with that of other observers, for I have encountered it most often in adults and only very rarely in children. During a period of service as member of a medical advisory board, I examined carefully the mouth and tongue in every one of 2,800 men referred for various physical defects, and found the geographic tongue in twenty. Most of the men so affected were not even aware of the presence of the disease. While in service at a base hospital several instances of it were seen in soldiers sent for treatment under the erroneous diagnosis of syphilis, or in soldiers presenting themselves voluntarily for advice as to the condition. The routine examination of the mouth and tongue of every patient may account for my observation that the disorder is not a rarity. A characteristic feature of the lesion is the yellowish or yellowish-gray color of the slightly elevated border, contrasting sharply with the red center.

MOELLER'S GLOSSITIS

Harris[12] has recently called attention to the uncommon condition known as Moeller's glossitis, or chronic superficial excoriation of the tongue, and described two cases observed by him. His publication has led to the recognition of additional cases, and to stimulate further interest it appears desirable at this time to direct attention again to this important and sometimes grave disorder. Harris gives this condensed picture of Moeller's glossitis:

> An affection of the tongue occurring in middle-aged adults, principally women, and affecting especially the tip and edges, but also the dorsum of the tongue; but at times also the inside of the lips, cheek, hard and soft palate, and characterized subjectively by a sensation of burning pain, and objectively by the presence of intensely red, sharply defined, irregular patches, in which the filiform papillae are thinned or absent, the fungiform papillae are swollen, and the stratum corneum desquamated. The condition shows periods of exacerbation and lessened intensity, but is very resistant to treatment and tends to persist. The severe pain caused by eating interferes with nutrition and may lead to grave consequences.

10. Mook, W. H.: J. Cutan. Dis. **33**: 667 (Oct.) 1915.
11. Howe, J. S.: J. Cutan. Dis. **21**: 254 (June) 1903.
12. Harris: J. Cutan. Dis. **33**: 742, 1915.

Though its symptoms are distinctive, Harris found the disease confused in the literature with geographic tongue, neuralgia of the tongue and lichen planus.

VINCENT'S DISEASE

It has been impressed on me by experience that, with the return of our troops to their home communities, Vincent's disease will probably become an important factor in the differential diagnosis of lesions of the mouth and other mucous surfaces. Attention has been called to the increase in the number of cases of Vincent's disease since 1915 in Canada[13] and England, among both the soldiers and the civilian population; but similar statistics as to the prevalence of the disease in this country are not available. As it is a communicable and curable affection, its early recognition is a mattter of considerable importance. Vincent's angina has been a widespread, though not common disease in this country for many years, and small, localized epidemics have at times occurred. Among the overseas troops, "trench mouth" has been identified as Vincent's disease, and statistics from one British military hospital in France state that it represented 23 per cent. of all throat complaints. Most of the patients with this affection whom I have seen and who had been overseas gave a history of trench mouth, usually described as of moderate severity; recent attacks were probably recurrent.

Vincent's disease may appear on the tonsil as a deep ulceration; on the ramus of the lower jaw posterior to the last molar tooth as a localized ulcerating patch; as a general mouth infection involving almost the entire mucosa, pharynx, and at times the tongue, or remain limited to the gums, where it is often primary and may be mistaken for pyorrhea alveolaris.[14] Mild cases tending to chronicity occur as tonsillitis or gingivitis of moderate degree, or on the cheeks and lips in shredlike patches resembling the condition observed in those who habitually bite the lip or cheek. These mild types may develop into severe attacks, with the formation of sloughing, serpiginous ulcers covered with a heavy, pultaceous, creamy, often adherent pseudomembrane. The ulceration may be superficial, or deep and destructive; it may spread with rapidity, and involve large areas of the mucosa. The breath is fetid, the glands are swollen, and the patient often presents a pallid or yellowish appearance, even in cases of moderate severity, though the systemic reaction is often less than would be expected.

The disease may also produce ulceration and gangrene of the vulva, conjunctivitis and an ulcerative balanitis. Greeley[15] has recorded a case with coincident purpuric eruption and bleeding from the nose and gums, in several attacks, ending fatally.

The spirillum of Vincent and the associated fusiform bacillus are recognized as the causative agents of the disease, and can be readily detected in smears. The organisms are also readily seen in dark-field preparations, and I have made frequent use of this method of diagnosis. The clinical resemblance to diphtheria is occasionally marked, and cultures should be made in all doubtful cases, as the two diseases may coexist.

The predicted increase in the number of cases of Vincent's disease indicates that it will enter more frequently than heretofore into the differential diagnosis of syphilis, and that familiarity with the various phases of its symptomatology will be required of the dermatologist. The possibility of confusing Vincent's disease with syphilis is not as remote as might appear, for the similarity of the lesions to mucous patches may be striking in the cases of moderate severity, and search should always be made for the organisms.

The possibility of coexistence of the two diseases should be kept in mind, as well as the fact that mercurial treatment may arouse to activity quiescent types of Vincent's disease in the syphilitic.

13. Laughlen, Warner and Holmes: Canad. M. A. J. **9**: 345, 1919.
14. McKinstry, W. H.: Brit. M. J. **1**: 421 (March 31) 1917. Campbell, A. R., and Dyas, A. D.: Vincent's Angina, J. A. M. A. **68**: 1596 (June 2) 1917.
15. Greeley, H.: Am. J. M. Sc. **155**: 742 (May) 1918.

ACCESSORY NASAL SINUSES OF CHILDREN *

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The views that I have expressed in several previous publications, dating back to 1912, as to the frequency of accessory sinus diseases in children, hold at the present time with additional emphasis. Subsequent investigation of anatomic specimens and references to the work of others seems to demonstrate that the accessory nasal sinus development occurs at a much earlier period than is generally considered by most investigators, and it is accepted that their variation in size, shape and position at different ages, up to the period when they assume the adult type, is extreme.

SINUSITIS IN THE CHILD

From a careful study of the early anatomic development of the sinuses, it seems probable that many cases of meningitis are the result of unrecognized inflammation of some of the sinuses, as the symptoms of sinusitis are more or less obscure in children. That this should be so can readily be appreciated from the structure of these parts at an early age, for they are surrounded by much softer bone than at a later period of life; there is a more profuse development of the lymphatic and vascular systems, and the mucosa is in most intimate relation with the osseous tissue, so that slight inflammation of the former must produce some pathologic change in the latter. My experience has been that in the child, chronic sinusitis is common, and it will be found on careful examination that many instances of postnasal catarrh in the child are but symptoms of some inflammatory condition of the adjacent sinuses.

DEVELOPMENT OF THE SINUSES

The reasons for the development of the nasal accessory sinuses have been defined by various authors with varying theories. Killian believes that the development of this area depends on the inherent biologic characteristics of the cells which go to form the various structures in this area. Coffin and Freres, however, explain the development on a physical basis. They believe that the reabsorption of bone is due to variations in air pressure, particularly that of expiration; that the principal growth of the sinuses begins after breathing occurs; that there is a distinct similarity between the effect of air pressure on the

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* The bacteriologic observations contained in this paper were obtained from experiments conducted by Dr. Mark J. Gottlieb, of the Laboratory for Clinical Research.

sinuses and on the alveoli of the lung, and that a constant change of air pressure in the sinuses, and, finally, the direction of the inspired and expired air bear a relation to the anatomic formation of the nose. These two authors also point out that children having adenoids present poorly developed sinuses, because of the lack of normal air pressure in the nose during expiration.

Functions.—The functions of the nasal accessory sinuses have been subject to considerable controversy, and no particular theory as to the physiology of these cavities has as yet been universally accepted. Whether the sinuses are the remains of rudimentary structures, which, in lower animals, serve as adjuvants to the act of smelling, or whether these cavities evenly distribute the inspired air and thus help olfaction, is still open to discussion, as well as the suggestion that the pneumatization and extension of these cells serve to lighten the bones of the skull in order that proper poise and counterpoise, may be maintained. The contention that they are an adjunct to respiration by moistening the inspired air is not supported by histologic findings, as there are no mucous glands in the mucosa of these cavities.

Early Appearance.—In connection with the anatomic development, it should be remembered that the maxillary sinus is well defined, although rudimentary, at birth, and even in the fetus it is found about the fourth month, so that inflammation of this sinus at an early age is not infrequent. From this early form, in which it has a triangular shape, it undergoes but little change until the second dentition, when the development of the molars and bicuspid teeth play an important part in its relation to the bones of the face. Previous to the completion of the first dentition, the odontoblasts are in the most intimate relation with the floor of the sinus, which continues to develop, but does not reach the adult type until about the twelfth year. The thickest wall is then found to be formed by the body of the superior maxilla posteriorly, while the orbital wall superiorly is of extreme tenuity. Much earlier, however, accessory foramina are found, as in the adult, and the stomata open into the middle meatus at the posterior end of the semilunar hiatus.

IMPORTANCE OF CELLS

Most important in the child are the inflammatory affections of the ethmoid cells, these cells and the antrums being more frequently involved than the frontal and sphenoidal sinuses. Evidences of the ethmoidal area are seen in the fetus about the eighth month; but development into distinct cells does not commence until the fourth year, and from that period on these tissues are susceptible to morbid changes, the cells reaching their maximum development about the twentieth year. In the child, as in the adult, the middle turbinated body is essentially a portion of the ethmoid area, although its anterior end is thinned out, is small and runs parallel to the perpendicular plate, so that the lower border is deflected inward. At about the eighth to the tenth year one finds that the ethmoidal ostia open into the nasal meatuses, and for surgical purposes, and especially in the recognition of morbid changes, the cells can be grouped into an anterior mass communicating with the middle meatus, while the posterior group opens into the superior meatus.

The anterior group is by far the more important, as its stomata are found along the semilunar hiatus and the fissure between the ethmoidal bulla and the inferior turbinated body, at a location at which infection from intranasal morbid changes most frequently takes place. The anterior cells are more numerous than the posterior, although the latter are larger as regards the capacity of the individual cells, and their stomata are much less in size than those of the anterior mass. As the internal wall of the orbital fossa forms the eternal boundary of the ethmoid, the possibility of orbital symptoms, as a complication of ethmoidal infection, is apparent. In operating on this region, this relationship must be borne in mind on account of the extreme thinness of the ethmoidal orbital wall, and the danger of injuring the contents of the orbital cavity.

FRONTAL AND SPHENOIDAL SINUSES

Previous to the seventh or eighth year, the frontal sinus is usually not developed, although not infrequently it is present as early as the fifth year. Before puberty, it does not extend far up in the frontal bone; then a marked change takes place until the eighteenth year, when its full development is accomplished. The anatomic and surgical relation differs in no way from that in the adult, except that its relation to the cranial cavity, on account of the thin posterior wall, is most intimate; and this must be considered in relation to inflammatory processes.

The sphenoidal sinus may show a definite cavity as early as the third year, while, by the seventh year, it is well developed; and although its inflammatory changes have not been as much studied as have those of the other sinuses, I am of the opinion that it is more frequently involved than is usually thought. Its lateral walls are largely within the intracranial cavity, and this deserves special consideration in relation to the development of obscure cases of basal meningitis, as do also its intimate relations laterally and superiorly with the internal carotid artery and cavernous sinus.

RECOGNITION OF SINUSITIS

The recognition of sinusitis in the child is more difficult than in the adult, as the symptoms are usually obscure and rarely characteristic; and it is unusual to have a single sinus involved to the exclusion of the others, the rule being that more than one sinus is affected at the same time. One can well appreciate the difficulty of differentiating individual inflammatory areas under such circumstances. When the upper sinuses are the seat of a purulent inflammation, the discharges may reinfect those lower down, and especially the maxillary antrum, so that the soft tissues around the stomata are kept irritated and swollen, and it becomes most difficult to differentiate the exact underlying faulty condition.

INVOLVEMENT DUE TO INFECTIOUS DISEASE

The frequency of occurrence of the infectious diseases in childhood, and the concomitant inflammatory changes of the nasal mucosa, explain why the sinuses are involved during this period, and they are involved particularly in influenza, scarlet fever, measles and pneumonia. In the vast majority of cases there is a primary inflammation of the nasal mucosa, and the sinuses involved become so from a direct extension of this inflammation, irrespective of its basal cause, the swelling of the soft tissues around

the sinus opening causing the secretions to be retained as a result of the stenosis which is produced.

In the new-born child, antral sinusitis may occur as a consequence of infection by vaginal discharges from the mother, or from injury—the result of instrumental delivery—and the resultant purulent inflammation involves the soft osseous antral walls. In my experience, this condition arising in small children from these causes or from others is a true sinusitis, as well defined as that found in the adult, and it is not a tuberculous caries or osteomyelitis, as has sometimes been claimed. As a rule, affections of the antrum occur during the second dentition, while, infrequently, errors in the development of the teeth may act as an exciting cause of the empyema.

The ethmoid labyrinth in the older child is especially liable to become involved in all inflammatory affections of the nasal mucosa, and in coryza; and in the contagious diseases of childhood these cells are affected in practically every instance, frequently accounting, to my mind, for suppurative ethmoiditis in later life, which has, in reality, existed from early childhood.

DRAINAGE

The nasal accessory sinuses are able, normally, to drain themselves continuously by virtue of the fact that, although their outlet openings are not in every instance situated at the most dependent portion of the cavity, their mucous membrane is furnished with ciliated epithelia, which constantly waft their cilia in the direction of the outlet. Furthermore, the normal openings of some of these cavities are in the most dependent portion of the sinus when the head is in the upright position. In the ethmoidal tract, the drainage may be exceedingly simple or intricate; the individual cells may drain by opening one into the other or directly into the nasal chamber.

BACTERIOLOGY

It is reasonable to presume that the bacteria found in the nasal accessory sinuses of infants and children during inflammatory conditions should be the same as the flora present in these cavities in the adult. Torne, as early as 1903, showed that without exception healthy sinuses were found sterile in cadavers within two hours after death. Zarnico tabulated the organisms in the order of their importance as infecting agents in accessory sinus disease as follows: *Diplococcus lanceolatus* (pneumococcus), staphylococcus and streptococcus, influenza bacillus, pseudodiphtheria bacillus, Friedländer's capsule bacillus, *Meningococcus intracellularis, Bacterium coli, Bacillus pyocyaneus, Bacillus pyogenes-foetidus.*

According to Turner, in twenty-two cases of acute and chronic fronto-ethmoidal sinus disease, the pneumococcus was isolated in eight (36 per cent.), *Streptococcus pyogenes* in nine (40 per cent.), and the staphylococcus in ten (45 per cent.). An organism which resembled the influenza bacillus occurred in one case. In forty-three cases of maxillary sinus disease, the pneumococcus was present in thirteen (30 per cent.), *Streptococcus pyogenes* in thirty-three (76 per cent.), staphylococci in thirty-four (79 per cent.), *Bacillus influenzae* in one, *Bacillus tuberculosis* in one, and *Micrococcus catarrhalis* in two. Babcock, in a recent investigation on the bacteriology of sinus infections, has shown that in fifty-three acute cases, pneumococci of the various groups were found in thirty-two instances, streptococci in five, staphylococci in thirty, and *Bacillus influenzae* in four. A number of other organisms which are not ordinarily pathogenic were also found, but did not occur alone. In forty-seven chronic cases, pneumococci were found six times; streptococci, nineteen; staphylococci, thirty-eight; *Bacillus influenzae,* twice, and many other organisms which were not supposed, however, to be pathogenic.

STAPHYLOCOCCI AS INFECTING ORGANISMS

We have observed in the results of all these investigations that staphylococci occur in equal, if not in greater frequency than the other organisms mentioned. The question of whether or not staphylococci are of infective consequence, when present in the secretions of infected nasal accessory sinuses, has arisen, therefore, many times in our mind. To answer the question we endeavored to determine whether or not the staphylococci isolated from the purulent discharges procured from the nasal accessory sinuses were pathogenic to rabbits.

The nasal chambers were irrigated with a sterile solution of sodium chlorid. The secretions were then sucked out of the nose into a sterile tube, and cultures were made from this pus on agar plates. The staphylococci were identified, by means of their staining characteristics with Gram's stain, and by the color and the general appearance of their colonies. Of seventeen specimens of pus secured from seventeen patients suffering from acute sinus disease of one or more cavities, staphylococci were recovered in eleven. In four, *Staphylococcus pyogenes-aureus* was found; in eight, *Staphylococcus albus,* and in two, *Staphylococcus citreus. Staphylococcus aureus* and *albus* were recovered together from three specimens.

In endeavoring to ascertain whether these organisms were pathogenic to rabbits, we first determined the maximum dose of nonvirulent staphylococci which the animal could be given intravenously without causing its death. For this purpose agar slants of uniform size were made, and the organisms were grown on them for twenty-four hours. A sufficient amount of sterile physiologic sodium chlorid solution was then poured into the tube up to the top of the slant, with the tube held in the upright position. The organisms were then scraped off the surface of the agar with a platinum loop, and the solution and the bacteria were poured into another tube and thoroughly shaken. Five-tenths c.c. of such suspension of nonvirulent staphylococci was the maximum dose that could be given to a rabbit intravenously without causing its death. Twenty-four hours after the rabbits were infected, blood cultures were made by paracentesis cordis and every twenty-four hours thereafter, until the cultures were found sterile or the animal died.

EFFECT ON RABBITS

One animal that received *Staphylococcus aureus* gave a sterile blood culture within three days. Another, whose blood culture was positive after twenty-four hours, died the following day, and on necropsy an extensive hemorrhage was found in the pericardial sac. The animal died as the result, probably, of the trauma incident to cardiopuncture. In a third, the blood culture remained positive until the animal's death, which was six days later, and on necropsy a purulent pericarditis and abscesses of the liver and kidney were found. Pure cultures of *Staphylococcus aureus* were recovered from these lesions. The fourth animal was found dead one day after infection. Free fluid in the pleural cavity was found,

as well as an abscess of the liver. Cultures from these produced not only *Staphylococcus aureus*, but, in addition, a gram-positive bacillus. All of the rabbits that were infected with *Staphylococcus albus* gave negative blood cultures in from three to seven days. In one case, the animal died two days after the blood culture was found sterile. There was marked congestion of the right lung, dilatation of the right heart, the left heart being empty, and there were a few grayish-white spots in the substance of the left kidney. Unfortunately, no cultures were made from these lesions. In the two rabbits in which *Staphylococcus citreus* was injected, the cultures were found sterile after the third day.

It can readily be seen, although the number of specimens examined is small, that only one out of seventeen cultures of staphylococci could be considered as definitely virulent. Our presumption, therefore, is that in the great majority of cases staphylococci are not the primary infecting organisms, but are secondary invaders which supplant the offending organism and prolong the symptoms.

THE DIAGNOSIS

The recognition of the various sinus affections in the child is more difficult than in the adult, as the subjective symptoms are not clearly defined. Transillumination is of value, but comparative studies must be made, as the area of light and shadow is rather different than in the adult. The use of carefully made roentgen plates, however, is of great service, especially as regards the presence of pus in the antra or frontal sinuses; and, previous to the tenth year, the use of the roentgen ray is the most valuable diagnostic medium that we possess. The presence of frequent headache should always occasion suspicion of sinus inflammation, and especially when the parts are tender to touch over the sinus involved, bearing in mind, however, that localizing pain with any degree of accuracy is difficult in the very young. In acute sinusitis, pain of an aching character is almost invariably present at some time during the course of the inflammation, but in chronic cases it is very frequently absent, unless the secretions are retained under pressure, when it may become most intense.

A marked symptom of great diagnostic value, when present, is the cessation of pain with the appearance of a free nasal discharge, and the return of the pain when the discharge lessens or temporarily ceases. The presence of a discharge, especially if unilateral and purulent, or semipurulent, in character, is always of diagnostic value, and especially if intermittent. If there is lymphoid tissue in the vault of the pharynx, most marked on the side from which the discharge comes, it will often be found that the adenoids are not the sole source of the continued coryza from which the child suffers, but that there is, in addition, a sinusitis. Location of the source of the discharge is of great value in determining which sinus is affected, and the method of ascertaining the source differs in no way from that employed in the case of the adult, which is so well known as to require no further discussion.

Aprosexia and disturbance in the general health are more or less inevitable concomitants of chronic purulent sinusitis, while complications, as in the adult, are not as frequent, although orbital symptoms are not uncommon. In the so-called strumous child, with whom there is a purulent nasal discharge, with excoriated upper lip and marginal blepharitis, and frequently with corneal ulcers, purulent sinusitis, usually of the antrum and of the ethmoid cells, exists; and while serious organic osseous changes are not present, when they do occur the ethmoid structures are most frequently involved. In purulent inflammation of these sinuses, and especially in that acute, fulminating type sometimes seen, serious orbital complications may ensue as a result of pathologic changes in the correlated vascular sinuses, with the development of thrombosis of the cavernous sinus and resultant pyemia, meningitis and death. In the milder form, a symptom not uncommon and always of diagnostic value is edema of the eyelids from vascular pressure. In inflammatory processes affecting the maxillary antrum, it is not uncommon to find some involvement of the osseous structures of the superior maxilla, if the purulent sinusitis is long continued; but in the majority of instances the affection presents rather a benign course and, only too frequently unrecognized, it is treated as "nasal catarrh." After the nasal chamber has been cleansed the reappearance of pus in the middle meatus is indicative of antral suppuration, but in older children puncture of the lateral nasal wall of the antrum is necessary to recognize the condition present.

CLOSE RELATIONSHIP

Inflammatory changes in the ethmoid structures, a result of neglected rhinitis, are frequently found. It has been my experience that isolated sinusitis is uncommon. In younger children, the antrum also is apt to be involved, while in older children the frontal sinus may be simultaneously affected. On account of the relation of the complicated ethmoid system to the other sinuses, and of the fact that pathologic changes occur here so frequently as a result of the infectious diseases of childhood, it will be found that this sinus is the primary source of infection in the great majority of cases of pansinusitis, and that this relationship is especially emphasized on account of the rather intimate connection of the various stomata of its component cells with the other sinuses, so that the presence of a purulent discharge which does not, to a greater or less degree, involve other sinuses, is almost impossible.

As a result of the late development of the frontal sinus, as has been pointed out previously, chronic changes are unusual; but its involvement in the older child during acute intranasal inflammation is much more frequent than is currently considered. The recognition of inflammatory changes in this region does not differ from that in the adult, and the presence of pus in the middle nasal meatus will aid greatly in establishing the diagnosis, although it may be easier to eliminate suppuration of the frontal sinus than to define its presence.

PURULENT SPHENOIDAL SINUSITIS

The recognition of purulent sphenoidal sinusitis is by far the most difficult, as it is practically always combined with ethmoidal changes, and the symptoms are not characteristic. Severe occipital or vertical headache, with more or less dizziness, is suggestive of retained secretions in this sinus; the discharges are scant and usually become inspissated in the nasopharynx or along the posterior portion of the vomer and floor of the choanae, and it will not infrequently be found that the condition cannot be recognized until exploration has been made of the interior of the sinus. In the young adult, however, the exploration should

not be made until the presence of other sinus affections of a purulent character has been eliminated.

The routine use of the pharyngoscope in young children has disclosed a surprisingly large number of cases of posterior ethmoidal and sphenoidal suppuration which would have remained unrecognized by any other method of examination.

Most important is the fact that these inflammatory invasions mean a radical disturbance of the entire drainage system of the nasal interior, and all treatment, whether conservative or radical, must rest on this basis. The relation of focal lesions in the accessory nasal cavities of children to systemic diseases, such as arthritis, endocarditis and nephritis, must be considered of an importance equal to that of the lesions occurring secondary to tonsillar and dental disease. Dr. Dean, the chairman of this section, has a very valuable contribution on this subject.

FIRST MEASURES IN TREATMENT

In treatment of sinusitis in the child, the aim ought always to be to destroy as little tissue as is consistent with obtaining permanent results, and, as far as possible, the intranasal mucosa should be preserved if operative procedures become necessary in the individual case. Palliative treatment will permanently cure the majority of acute sinus inflammations when such treatment is intelligently directed toward free drainage.

Previous to the employment of surgical measures, therefore, the use of warm alkaline sprays and of weak epinephrin solution to reduce the congested mucosa, with, if the case is severe, rest in bed, the employment of laxatives and such general measures as may be indicated in the particular case, will often produce the most happy results; and in this connection it should be remembered that the tendency of acute sinusitis is toward cure, and the use of the measures outlined will not infrequently remove the inflammation when operation would have been resorted to unnecessarily, with possibly much less satisfactory results.

In these instances in which the sinus disease has continued and resists treatment, it will often be found that the general health of the child was more or less seriously affected previous to the development of the nasal affection, as a result of the original disease causing it; and until proper care of the general health is instituted, local measures alone will not be of great avail.

The employment of some type of suctional, negative pressure apparatus, applied intranasally for freeing the nose and ostia of secretions, proves very beneficial. The congestive hyperemia which is thereby induced is oftentimes decidedly curative. I have had no experience with the employment of autogenous vaccines in the treatment of sinus disease of children, but believe they probably have the same relative value as in the adult. The question of dosage must, however, be carefully considered.

I believe intranasal treatment to be indicated primarily in all cases of sinusitis in children; but it should be strongly emphasized that the turbinal tissue should be preserved; and while it is necessary at times to remove the anterior end of the middle turbinated body, the removal of its entire structure to reach the stomata of any of the sinuses is not warranted. When possible, drainage should be obtained through the natural openings, and to accomplish this it is proper to remove as much of the osseous tissue at such points as may be required.

When the frontal sinus is involved, its relation to the anterior group of ethmoid cells is such that attention must be paid to them before the inflammation of the mucosa lining the frontal sinus will subside.

When the antrum is diseased inflammatory changes, as a rule, readily subside under ordinary treatment; but in obstinate cases, after fracturing and pushing aside the inferior turbinated body, a large opening should be made through the inferior meatus into the sinus, and the parts drained in this way, the question of whether or not irrigation is advisable is to be decided by the character and chronicity of the purulent discharge.

OPERATIVE PROCEDURE

In certain fulminating forms of sinusitis in the child, and in persistent suppurative cases resisting endonasal treatment, with marked impairment of the general health or other violently acute symptoms, an external operation will be indicated. The physician must bear in mind, however, that before any radical external operation on the child is undertaken, a most careful examination should be made for any morbid changes in adjacent areas which may be keeping up the sinusitis by interfering with drainage, as it has been my experience that in not a few instances treatment for a considerable time may be of no benefit until a hypertrophy of the middle turbinated body has been removed, or a lymphoid mass in the nasopharynx, which has acted as a constant source of reinfection. It should be emphasized that any enlargement of the middle turbinated body is a serious obstacle to the cure of inflammatory changes in any sinus, and until it has been relieved the sinusitis will prove most obstinate to treatment.

Free drainage must be secured before a cure can be obtained, and if intranasal treatment fails to obtain such a result, then whatever radical operation may be selected should be performed. It should also be emphasized in this connection that free drainage means free nasal respiration, and this is another prominent factor that must be taken into consideration in the surgical treatment of these conditions. In addition, it is essential that when pus is found in any of the sinuses it must be evacuated as a surgical principle, and granulations and necrosed tissues must be thoroughly removed. On this basis rests the surgical treatment of all chronic sinus affections, with the various modifications of technic in the care of the individual sinuses dependent on the peculiar anatomic structural characteristic of each.

When the external radical operation on the frontal sinus is under consideration, it is essential, therefore, as a preliminary step, to remove the anterior portion of the middle turbinated body in order to secure thorough drainage, and not infrequently this procedure may bring about a cure. The external operation on the frontal sinus in the young should be performed with the greatest reluctance in the absence of definite external or intracranial symptoms. In those cases in which the frontal sinusitis has been unrecognized, a fistula may have resulted, and the condition possibly has been treated as a dacrocystitis. The only method by which relief may be obtained is by thoroughly opening the sinus, externally cleaning out the anterior ethmoid cells, which are always involved, and obtaining free drainage through the nasal chambers.

OTHER METHODS

In children, the antrum rarely requires external operation, as opening the lower nasal fossa with irrigation is usually sufficient to obtain a cure of the suppuration. In young children, operative work on the maxillary antrum must be performed with great caution, on account of the relation to the teeth at this age. Such procedures, during the formative period of the teeth, are apt to result most disastrously.

As a result of these studies it has been my experience that a radical external operation for the relief of purulent sinusitis is rarely indicated and is not productive of as satisfactory results as the more conservative intranasal procedures. Should indications arise however, demanding such external surgical interference, the same type of operative attack applies as in the adult.

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ABSTRACT OF DISCUSSION

Dr. Charles Gilmore Kerley, New York: In my professional work I have been unable in several instances to induce the laryngologist to make a diagnosis of sinusitis in children where I thought it ought to be made. It seemed to me that with the rhinologists and laryngologists sinusitis in the child was sometimes overlooked. This was not the fulminating case, which is easy to diagnose. The cases that come to me as a pediatrist are those that have often gone through the hands of the laryngologist. As one mother expressed it, the laryngologist had cut out everything in sight and out of sight, and still the child had a persistent running nose. She told me that the discharge was enormous and claimed that it took three handkerchiefs to make the trip to my office and back, a period of five hours. She showed me a handkerchief, and it was filled with a secretion, moist and of a lightish yellow color, showing that it was purulent. I told this mother that her child had sinus disease. Whereupon she told me a laryngologist had sent her to me because he had finished with the case and it was up to me to build up the child. This boy was a bright, normal, husky boy. He had good blood, his urine was normal and yet he had this persistent discharge. What did he have? He had a multiple infection, a multiple sinus infection without any damming back of secretions. Headache of obscure origin is a prominent symptom in these cases. When a child has headache, when he complains of pain, he does not deceive. Pain complained of by a child always means pain, and headache is a frequent symptom in the sinus cases. Another symptom is a persistent fever. A child has a fever that ranges from 99 to 101. Perhaps the condition has continued for several weeks. We examine for pyelitis, for tuberculosis and other conditions that might cause a persistent slight elevation of temperature. Sinusitis of a mild type has to be considered in making a diagnosis when there is a persistent temperature elevation extending over a considerable period of time. Another point that has been impressed on me in connection with work with children is that there are various diseases of adults that are acquired in childhood. Pyelitis is one. I am confident that children may have sinus disease, which, because of the obscure characteristic symptoms, is not recognized and is carried into adult life.

Dr. J. M. McTiernan, New York: Several years ago I heard Dr. Kerley ask for some definite information as to sinus conditions in children, and I kept a record of 197 cases referred to me for removal of tonsils and adenoids. I found an almost normal nasopharynx in eighteen cases. These patients had a chronic discharge from the nostrils, a pale thickened membrane and were marked mouth breathers. Where sinus complications exist, if a saline solution is used first to wash out the nasal cavity and then a few drops of epinephrin are used, often the diagnosis can be made. I have seen headache and malaise in children relieved entirely by the treatment of sinus conditions. However, all mouth breathers are subject to headaches. I cannot agree with Dr. Oppenheimer that it is the frequent headache which is a symptom of sinusitis in a child. I believe that a persistent, chronic headache, that headache for which a child so often wears glasses without relief, is the characteristic headache which signifies a sinus condition. I had one case where a chronic headache had existed since the patient was 8 years of age, and it was relieved when he was 16 years of age by taking off the sphenoidal wall at the right side, although the cavity had been washed out at different periods for several years.

Dr. Emil Mayer, New York: I want to call attention to one form of this affection that Dr. Oppenheimer evidently overlooked, and that is the infection of the antrum and ethmoid in the very young child, the infant. There are only a few cases on record. I believe I was among the first to call attention to that many years ago, and in looking up the few cases which were recorded it was remarkable to observe the similarity of the symptoms. Each one of these patients had a curious opening on the cheek and a foul-smelling discharge from the nose. In those instances there is only one thing to do, and that is to enlarge the already existing opening and curet entirely through the nose and cleanse it. This case occurred before the day of the roentgen ray and before we knew anything about the bacteriology of it, but the chairman in his article on affections of the accessory sinuses in children last year mentioned that class of cases, and I believe it should be recorded in connection with the kind of cases mentioned by the speaker.

Sir St. Clair Thomson, London, England: This is a very important question, because we have not yet realized the connection between rhinitis and sinusitis in infancy and childhood and the atrophic rhinitis and ozena of later life. I would suggest to those in active practice that they try to get what we have long been working for, that is, postmortem examinations. We should get the pathologists in every hospital to open all the sinuses in every case that comes to postmortem, it is an operation that can be done without special equipment and it should be done as systematically as opening the other chief cavities of the body. Of course, the cases we should like to see are those that end fatally and suddenly as the result of an accident, because it will for some time be difficult to say whether the pus found in the sinuses of a patient dying of an ordinary disease, say bronchitis, dysentery, typhoid fever or pneumonia, is merely a part of the death process and not a primary focus. I throw that out as a suggestion. Sinusitis in children can be divided into those cases that are due to a focus of infection in the adenoids, and those where the focus is somewhere else. As to the infection which comes from somewhere else much work has been done in England to show that cases which we are apt to call sinusitis are really cases of osteomyelitis of the superior maxillary. Speaking of adenoids, Sir William Osler, who has had experience in three countries—Canada, the United States and England—has given it as his opinion that there are more adenoid children to the acre in England than anywhere else in the world. My experience is that a majority of cases of sinusitis in children, just as are a majority of cases of bronchial infection and, I am almost inclined to think, also a majority of cases of chronic gastric catarrh, are due to infection of the adenoid mass. I do not think that every mass of adenoid tissue is dangerous. Quite the contrary. I am making some investigations in an institution with which I am connected and where adenoids and septums and sinuses do not come for treatment, that is, a sanitarium for the tuberculous where I go once a week and examine every patient. Many patients still possess their tonsils and septums, their adenoids are still there and are doing no harm. It is not a mechanical process in the adenoid itself that it becomes a focus of infection. That is the dugout where the enemy entrenches itself, and we think it is easier and, if I may use the term, a more sporting proposition to blow up that dugout than to try to drive out the enemy by poison gas. The first line of attack is the adenoid. The only objection is that the young laryngologist is apt to see a fee in an adenoid, sometimes when there is no adenoid there.

Dr. I. W. Voorhees, New York: How does Dr. Oppenheimer examine these patients in his office? Children come accompanied by their mother and are very much afraid. If you have another child or nervous adults waiting outside and they hear a cry or scream, it disrupts the day's work. Another point is the necessity of differentiating between a foreign body and unilateral sinus disease. Just recently a girl, 8 years of age, came to the clinic with a unilateral nasal discharge. I attempted to see if there was any foreign body present but found none. I then examined her under ether and failed to find a foreign body. She was then roentgenographed and the report stated: "Left antrum filled with pus." The child was admitted for opening of the nasoantral wall, but unfortunately the admission slip was lost and a tonsillectomy and an adenectomy were reported done instead. The mother came back three days later and said that four years ago the tonsils had been removed. I examined the child and found signs of an old successful tonsillectomy. She still has empyema of the antrum and the mother will allow nothing to be done.

Dr. G. W. McKenzie, Philadelphia: I understood Dr. Oppenheimer to say that the sinus contained no mucous glands. I question that, because I have done a lot of study on that and my impression is that the sinuses do contain mucous glands, and that there are mucus secreting cells.

Dr. Lee W. Dean, Iowa City, Iowa: In connection with disease of the nasal sinuses in children, it seems to me there is one thing that is axiomatic, and that is the point made by Sir St. Clair Thomson, that the first treatment of sinus disease in children or infants is the eradication of the diseased adenoid tissue in the nasopharynx, which is usually the source of infection. We have now a series of from 75 to 100 cases of sinus disease in infants and children under 12 years of age, where four out of five have been completely cured, so far as the nasal sinus disease is concerned, by the removal of the diseased adenoid tissue in the nasopharynx. The investigation was made in this way. These patients were examined, a diagnosis was made, and then the diseased adenoid tissue was removed. No other treatment was given. The patients left our service and in four or five weeks came again for examination. We found that four out of five of these young children were well, so far as the nasal sinus disease was concerned. When we found that the fifth child did not get well, we resorted to other measures. Investigating the bacteriology of our sinus cases in infants and young children, we found that in eleven out of twelve cases in which there was an arthritis the hemolytic streptococcus was in the sinus, while in those cases in which there was no marked systemic lesion the hemolytic streptococcus was found in only 4 or 6 per cent. of the cases. In the twelve cases with arthritis, the tonsils and adenoids had been removed months before the cases were investigated. Following treatment of the sinuses which were affected marked improvement of the arthritis resulted in every case.

Dr. Seymour Oppenheimer, New York: In a paper read in New York Dr. Dean brought out particularly the relationship of accessory sinus disease to general systemic manifestations. It has been his experience, as well as my own, that in any number of cases that have been referred to us from the pediatric department or from the general practitioner for determination of where the focus was which was causing the arthritis or other manifestation, that by very careful observation we were able to localize and cure the systemic manifestation after having determined that the focus was in the nasal accessory cavities. Dr. Dean called attention to the fact that in some instances it is not necessary to attack these cavities surgically; however, the simple removal of a mass of lymphoid tissue may be sufficient to allow the proper drainage. I also want to refer to a method mentioned in the chairman's paper, that is, the investigation of these cases while the child is under anesthesia when it is being operated on for diseased adenoids and tonsils. That is the time to puncture the antrum and irrigate it. Dr. Voorhees spoke of the difficulty of examination. I grant that it is extremely difficult in children, but there are methods which can be employed. First of all we must estimate something as to the general appearance of the mucous membrane of the nose. I have had constructed a very thin bladed speculum of the Killian type which I am able to introduce into the nose and frequently I am able to illuminate the regions that otherwise are not visible. The use of the nasopharyngoscope is most valuable, plus the employment of suction methods in withdrawing secretions. It is not unusual, instead of finding a nose full to find no evidence of secretion; but after the employment of suction methods the secretion is profuse. Sir St. Clair Thomson referred to the fact that the young laryngologist saw in the adenoids a fee. That is quite correct. I have seen a number of children, both in private and hospital practice, where on inspection of the throat a large mass of mucopus was seen dropping down from the nasopharynx. We may jump to the conclusion that the child has a mass of lymphoid tissue, but the history in some cases is that the child has been operated on already. In some instances the secretions may come from an infected sphenoid cavity, and, as I stated, it has been a source of surprise to me how frequently we have been able to demonstrate pus coming directly from the posterior ethmoid cells and from the sphenoid cavity, and in several cases we have been able to show it coming from the ostium of the sphenoid cavity. Any excessive temperature elevation in a child should always call attention to the nasal accessory sinuses.

Dr. Kerley asked what is the symptom complex of chronic sinusitis. I might reply to that by saying, the intranasal finding of purulent discharge. The other general systemic manifestations, such as aching, temperature elevation and a general lack of well being must be considered, but a good diagnosis is practically established by finding a mucopurulent discharge from the nose. It must be borne in mind that a mucopurulent discharge from the nose does not come from the nasal mucosa per se, but that every child recovering from scarlet fever or measles has evidence of a mucopurulent discharge from the nose and that is coming from the nasal accessory cavities.

THE ANALYSIS OF HUMAN MILK

TECHNIC OF OBTAINING SAMPLES AND INTERPRETATION OF RESULTS *

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The increased interest in breast feeding, which has been the result of recent articles both by pediatricians and by those interested in public health, has again turned the attention of clinicians to the chemical composition of human milk. It is in place at this time, therefore, to draw attention to mistakes which may be made in obtaining the specimens for chemical analysis, the method of analysis, and the interpretation of reports sent by the chemist. Human milk has often been sent to the chemical laboratory for analysis when a baby is sick, and a report returned giving the percentage of fat, lactose and protein. In many instances the practitioner has not been sufficiently familiar with the normal composition of human milk, and its variations under normal conditions, to interpret from the results of the examination whether the milk is abnormal or not; and because of this ignorance many babies have been deprived of their mother's milk when the milk has been normal. It should be a rule, therefore, that an infant should not be weaned because of the analysis of the milk until it has been proved, first, that the milk is harmful to the infant, and secondly, that its composition is abnormal. The composition cannot be said to be abnormal until it is found to be

* From the Children's Medical Department of the Massachusetts General Hospital.

* Read before the Section on Diseases of Children at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

outside the limits of the normal variations of human milk. As will be shown later, the variations of human milk have much wider limits than were previously taught.

The second source of error is the method of obtaining the sample for examination. In order that it shall represent the true analysis of human milk, it must be obtained in one of two ways: First, all the milk should be drawn or expressed from one breast and sent either in bulk or in mixed sample to the chemist. The difficulty with this procedure is to know whether all the milk has been obtained or not. The only way to control this would be to spend the preceding twenty-four hours weighing the baby before and after each nursing to determine how many ounces of milk are taken on the average. When this is known, it can be estimated whether the entire amount of milk has been obtained in the sample sent for analysis. The second method is much simpler in that it only requires the nurse to obtain 1 ounce of milk before nursing and 1 ounce after nursing. These two ounces may be analyzed separately or mixed, but if analyzed separately, they must be averaged.

This complicated procedure is necessary since the percentage of fat is much lower at the beginning than at the end of nursing, the difference occasionally being as much as 10 per cent. The percentage of lactose also changes, although to a less marked degree, being higher at the commencement of a single nursing than it is at the end. The difference in protein is less pronounced and will hardly lead to error. Because of these wide variations it may be seen how easily a wrong interpretation may be made.

The time of day that the milk is drawn also has an influence on the composition of the milk. These figures, which show that there is a difference in the percentage of fat at different times of day, will be reported in another place by Dr. Denis and myself. The highest percentages come at noon or in the afternoon, and sometimes are so high that, if taken alone, they would be considered pathologic. The best time to take a sample of milk for analysis which will give the most characteristic figures is 9 or 10 o'clock in the morning.

The following is an example of how a physician may be led astray by the analysis of breast milk which was obtained in the wrong manner: A sample of 1 ounce was obtained before nursing from a mother whose baby had failed to gain for one week and seemed uncomfortable. The analysis of this sample was: Fat, 1.5 per cent.; lactose, 7.7 per cent.; protein, 1.18 per cent. If these figures are compared with those given in most books as normal figures, namely, fat, 4 per cent.; lactose, 7 per cent.; protein, 1.5 per cent., the sample obtained would prove to be very weak and would explain why the baby was not gaining. I venture to say that in many instances such an analysis would be interpreted as sufficient reason for weaning the infant. This was not done in this case, however, because the milk, when obtained in the correct manner, proved to be a perfectly normal milk. Samples obtained later from the same patient, both before and after nursing, when mixed, contained: fat, 4.05 per cent.; lactose, 7.5 per cent.; protein, 1.16 per cent., which is a perfectly normal human milk. If the first sample had been obtained immediately after nursing, instead of before nursing, the composition would have been: fat, 6.6 per cent.; lactose, 7.4 per cent.; protein, 1.13 per cent., and the milk would have been said to be too rich and, therefore, indigestible. It is clear, therefore, that breast milk procured for chemical analysis must be taken in one of the two ways outlined above.

Although the method of collecting samples of breast milk is of great importance, the methods of analysis are of equal importance. To inaccurate methods of analysis are due mistakes which are responsible for depriving the baby of its mother's milk. The usual method of analysis used by clinicians and many laboratories is somewhat as follows: First, the fat is determined by the Babcock method, which is sufficiently accurate for all practical purposes; the proportion of sugar is assumed to be so nearly constant that it is set at 7 per cent., and the protein is obtained by subtracting the assumed and known constituents from the solids. Such a method is extremely inaccurate because there is a normal variation of from 6 to 8 per cent. in the lactose content of normal human milk. This variation, of course, reflects on the percentage of protein found in the answer and gives incorrect results. The following analysis was given to me from a case which had a classical textbook history of protein indigestion: fat, 2 per cent.; lactose, 7 per cent.; protein, 4 per cent. Such a milk, if correctly obtained and accurately analyzed, is very abnormal. The symptoms were loss of weight, vomiting, and watery stools containing curds. The analysis of the milk seemed to explain these symptoms and to warrant weaning the baby. On close questioning, however, it was found that the sample of milk was taken from the mother before the baby had nursed because it was more easily obtained at that time. Since there was doubt also as to whether it represented the true chemical analysis, another set of samples were taken correctly, 1 ounce before nursing and 1 ounce after nursing, both of which were mixed and analyzed by Dr. Denis. The fat was determined by the Babcock method, the protein by the Kjeldahl, and the lactose by the Folin-Denis titration method.[1] Its true composition was found to be: fat, 4.35 per cent.; lactose, 7.08 per cent., and protein, 1.75 per cent. This analysis, although slightly richer in protein than the average, was within normal limits for the age. The baby was therefore, not weaned and the symptoms of indigestion were found to be due to other causes. After these causes were removed, the baby did well on the breast.

It is necessary, therefore, both to have the sample of milk obtained in the proper manner, and to have it analyzed by accurate methods before deciding that a single analysis justifies weaning the infant and depriving it of its mother's milk.

In what way can the analysis of human milk help one clinically? The analysis of human milk is of value only when the physician understands its normal variations. Unfortunately, most of us are more interested in the pathologic than in the normal or the physiologic; and when we have to decide whether a given sample is pathologic or not, we are in consequence unable to answer the question. Pathologic chemical variations in human milk are less common than the textbooks lead us to suppose. In the majority of instances the symptoms and not the gross chemical composition of the milk decide for or against weaning. In the following case, the analysis of the milk probably explained the baby's symptoms of indigestion: The baby was having a

1. Folin and Denis: J. Biol. Chem. **33**: 521 (March) 1918.

great deal of gas and distress, crying most of the day, and passing six green, irritating stools a day which, under the microscope, were seen to contain considerable fat. The mother had considerable gas in the bowels. The analysis showed: fat, 1.4 per cent.; lactose, 8 per cent., and protein, 1.07 per cent. Although no single component was excessively high, the relative *proportions* of the fat, lactose and protein were abnormal. In this instance after weaning, the baby straightened out on a simple formula of cow's milk.

In another instance a baby was being fed by a wetnurse who also gave her own baby the breast after the foster-baby received what it needed. It was noticed that although the wetnurse's baby gained rapidly, it was uncomfortable and a good part of the time had undigested stools. As time went on the fosterbaby did not receive enough milk and was given all of the wetnurse's milk. It then commenced to have indigestion, and it was found on analysis that the additional milk, namely, the end of the milk of the nursing, contained 8 per cent fat. After a wetnurse with poorer milk was obtained, there were no symptoms of indigestion, and the baby gained weight in a normal manner.

SUMMARY

1. Mixed samples of milk taken before and after nursing, or the entire amount of one breast, must be taken to obtain a characteristic sample of milk for analysis. It should be drawn at 9 or 10 a. m.

2. Accurate methods of chemical analysis must be used. Clinical laboratory tests cannot be depended on because of their inaccuracies.

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ABSTRACT OF DISCUSSION

Dr. John Foote, Washington: I think all the great pediatrists have written about the necessity of milk examination. Soranus of Ephesus was the first. He described the thumbnail test in the second century, A. D. Breast milk varies depending on when the milk is taken, whether at the beginning, the middle or the end of the nursing, and the quality of the milk often depends on the time of day or whether it is taken from one breast or the other, so the matter of making a milk analysis involves many considerations. This was pointed out clearly by Dr. Abt in a splendid monograph a few years ago. The thumbnail test of Soranus was quite as accurate as some of our modern lactometer estimations of the quality of breast milk derived from a single sample.

Dr. James D. Love, Jacksonville: I am convinced that the routine examination of breast milk as commonly practised with a lactometer more often leads us astray than not. A mother may state that her milk is thin and bluish in appearance and she submits a specimen for examination. We may find that this milk is deficient in fats and apparently is not a milk on which the baby will thrive; and yet the baby is thriving and taking on weight. Too often we base our estimate on examination of a given specimen of milk. As Dr. Foote has said, the milk in the morning will differ very materially from an afternoon specimen. If the baby is nursing every two or three hours, the milk carries materially more fat than if the baby is nursing every four hours. I merely wish to make the point that unless an examination is made properly and the milk is selected from at least two or three specimens in the course of the day, the routine examination of milk as performed by the average physician will often lead to erroneous conclusions.

Dr. Fritz B. Talbot, Boston: The appearance of the milk really does not tell you anything. We have seen milks that have been very yellow, looked very rich, and yet they have had only 0.9 per cent. of fat in them.

ANOMALIES OF TUBERCULOSIS IN THE HIGHLANDS OF COLOMBIA

A NEW DIAGNOSTIC SIGN IN INCIPIENT CASES

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Physicians of the early part of this century observed a curious evolution of tuberculosis in the great Colombian Highlands. These highlands have an elevation of about 11,800 feet above sea level, and are inhabited by an Indo-Spanish race which numbers very few Indians and many pure descendants of the conquerors. The highlands have an average temperature of from 14 to 16 C. (or 57.2 to 60.8 F.), with an inexhaustible fertility, and are not very thickly populated. Both men and animals progress admirably in this region, notwithstanding deficient hygienic conditions inherited from our Castilian fathers.

I wish to describe the invasion of tuberculosis in these places, which a few years ago were almost free of the Koch bacillus. Today the region is infested with this terrible malady, but with pathologic peculiarities different from what prevails in the temperate zone.

Immunity to tuberculosis is produced by the constant production of antibodies by lymph nodes or other tuberculous tissues. In the highlands of Colombia, certain forms of tuberculosis are most common because the race does not possess immunity to tuberculosis in any degree. The study of these problems is to me of the greatest importance. In the years from 1896 to 1899, I was shown in the clinic of my teacher, Dr. Josue Gomez, in the Hospital de Caridad of Bogota (Charity Hospital), as a pathologic rarity, one or two cases of pulmonary tuberculosis. On the other hand, there were frequent cases diagnosed as tuberculous peritonitis. Numerous necropsies demonstrated the truth of his assertions. Dr. Gomez attributed this phenomenon to various causes. I believe that it was tuberculosis of the mesenteric lymphatics in men who did not have ancestral immunity. This made the invasion of the tuberculosis more rapid so that the action of the antibodies did not stop the rapid peritoneal invasion. Probably, then, the lungs were kept almost immune, the mesenteric ganglions being the place selected by the first tuberculous invasion. The invasion in these organs not immune *per continuitatem* occurred with a rapidity which did not permit the development of antibodies.

During the last four years I have served as professor in the same clinic and have observed hundreds of such cases. There were three things that called my attention especially to the curious nature of the disease in the highlands of Bogota: the rapid cavity formation, the miliary forms, and the tuberculous meningitis.

N. N., a man from the country, aged 24, had vomited blood two months before admission, while at his farm, without feeling previously ill. He felt better a few days later, continued his work at the farm, and having vomited blood again forty days afterward, went to Bogota and took a bed in the Hospital de Caridad.

While making the morning rounds, my intern and my chief head of the clinic showed me that case as gastric hemorrhage with vomiting. The man had powerful muscles and a perfect frame, with not a single degenerative stigma. He was a beautiful example of that hardened and healthy type of our

country. On examining him, simple percussion revealed to me the existence of a cavity larger than a dove's egg in the apex of the left lung. The auscultation confirmed my diagnosis. There was nothing else; not an enlarged lymph node; not even a strange noise besides the cavity phenomenon. Based on previous cases observed in my clinic I gave a fatal prognosis. In fact, ten or twelve days later my patient died in a hemoptysis, and the necropsy revealed, as the only tuberculous lesion, the cavity previously diagnosed. In this case, as in eight or ten others, the man was free from hereditary tuberculosis, not having in any other part of his body a tuberculous lesion that might have produced antituberculins.

Tuberculous meningitis also belongs to the not uncommon form of acute tuberculosis generally occurring in the sick—more often in women—while convalescing from great hyperpyrexia, principally from typhoid fever. It is not unusual, observing the cases attentively, to find that the bed next to the meningitis patient is occupied by a tuberculous patient, although on examining the meningitis patient no tuberculosis has been found. Here is new ground, not previously immune, in which, as in the case of a child, the malady takes its most virulent form.

Miliary tuberculosis adopts forms similar to those already mentioned. I was able to observe its frequency after severe hemorrhages in patients not previously subject to tuberculosis.

There are, however, numerous cases of chronic pulmonary tuberculosis. A very curious phenomenon is the clear diversity in pulmonary tuberculosis contracted in the highlands and that contracted in sea level regions. Even if there is no morphologic diversity between the bacilli of one and the other, the clinical evolution of the disease is very different.

Native and foreign men afflicted with tuberculosis who come to the highlands react marvelously to the climate and well-directed treatment. Having been during several years physician for a corporation that imported into the country numerous tuberculous patients, and which took great care in their treatment of them, I had the advantage of seeing some remarkable cures. Only the tuberculous patients with cavities who are so unfortunate (as many are) as to be subject to arterial hypertension die rapidly with hemoptysis.

On the other hand, persons acquiring tuberculosis in the highlands take a slow and sluggish reaction to all treatment. Being acclimated, these patients do not benefit from the advantages of the climate.

A NEW SIGN FOR THE EARLY DIAGNOSIS OF INCIPIENT PULMONARY TUBERCULOSIS

The new sign which I describe has been found in 169 cases of incipient pulmonary tuberculosis. It consists of the reenforcement of the whispered voice in the vertex of the affected lung. This sign appears before the disease reveals itself by any other symptom, either auscultatory or percussional, before respiratory inversion and impairment in the supraspinal triangle of the affected side, which the classics consider as first signs of the malady, appear. A stethoscope and a little practice are enough to find it. The mechanism of the sign is very simple: it might be said that it is the same as the respiratory inversion, and that, examining not the respiratory noise, but the whispered voice, the physician resorts to a trick which allows him to confirm the beginning of the tuberculous process, in a period before the appearance of the principal respiratory inversion.

It is well known that to auscultation, inspiration is noisy and expiration silent. The murmur is produced, not only by the expanding of the pulmonary vesicles, but because each column of air breaking in the flute-like point which forms each bronchial subdivision has to produce a musical sound. This sound is helped also because the column of air subdivides itself in the thick and narrow tubes. The normal exhaling, however, is silent. Now the respiration of a person at rest, who breathes with the mouth open (as in the position of auscultation) and heard near the mouth, presents a phenomenon quite opposite: the exhaling is more noisy than the inhaling. This exhaling murmur is produced in the larynx and pharynx, these organs being the first obstacles that the outcoming column of air finds in which it can produce a musical sound. We see, then, that almost all exhaling reenforcement that is found in auscultation is originated in the larynx, the trachea, and the thick bronchial tubes. The ear that auscults hears them, thanks to the fact that they pass through pulmonary tissues more dense which allow sounds to pass better.

Laënnec showed that the first period of tuberculosis is characterized by a peribronchitis; that is to say, an infiltration of the interstitial peribronchial tissues. This sign is a physical phenomenon. The interstitial peribronchial inflammation increases the density of the lung, and owing to the easy transmission of sound by dense tissues, the larynx and tracheobronchial noises are transmitted in a better way to the ear that auscults, through a tissue of greater density. This explains the respiratory inversion, that is, the reenforcement of the expiration.

When the peribronchial injury is not sufficiently extensive; when the interstitial tissues of the lung have not yet increased enough to conduct with clearness to the ear that auscultates the tracheobronchial noise, it is sufficient to make the patient repeat in a low voice in each expiration a word rich in consonants. In an instant the ear will perceive the great difference that exists, in the case of incipient tuberculosis, between the healthy and the affected side. With a stethoscope carefully applied to the ear, isolating outside noises, a very muffled murmur is perceived, at most, from the healthy side, while from the affected side each syllable is distinctly heard, with such force that it reaches sometimes the degree of whispered pectoriloquy.

I have followed the progress of 169 tuberculous patients from the beginning of the malady; in many of them before the appearance of the slightest symptom. Always, sooner or later, this sign appeared before the respiratory reenforcement and other signs that, associated, did not leave doubt for the diagnosis.

Naturally, in cases in which there already exists respiratory inversion, the sign of the reenforcement of the whispered voice is much more accentuated, getting to be, sometimes, almost pectoriloquy. This sign should not be confused with whispered pectoriloquy, which may accompany tuberculous pneumonia of the apex of the lung, which has an acute progress, with blowing and other signs. The cavities are accompanied also by tympany to percussion. The Niess sign, consisting of whispered pectoriloquy in the space situated between the inside edge of the scapula and the columnar vertebrae, is found also in bronchial adenopathy. Its cause is the transmission of the tracheobronchial breath through the hypertrophic lymphatic

masses. It has nothing to do, therefore, with that which I have described in this study.

As counter control of the sign of the reenforcement of the whispered voice, I had 140 convalescing and debilitated patients (with uncinariasis, anemia, chlorosis, etc.) under observation, who did not present the sign.

The sign described appears at the beginning of the tuberculous lung process, when the roentgen rays do not even give a distinct shadow and when there is not yet any other sign either auscultatory or percussional. Moreover, one may easily become accustomed to finding it.

CLINICAL DIAGNOSIS AS COMPARED WITH NECROPSY FINDINGS

IN SIX HUNDRED CASES *

HOWARD T. KARSNER, M.D.
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AND
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CLEVELAND

The greatest strides in the wonderful advances of modern clinical medicine have been made by virtue of investigations in chemistry and in physics, in some instances advances with which it has been impossible for pathologic anatomy and histology to keep pace. On the other hand, there are numerous well established conceptions in pathologic anatomy from which the clinical diagnosis must depart, the latter naming the condition in a fashion descriptive of its pathologic anatomy. Not infrequently, methods of functional diagnosis have been widely applied in the clinics after having been verified at the necropsy table in only a limited number of instances, a fact only too well known by critical readers of recent medical literature.

It is not our intention to underestimate the value of clinical investigation, nor, on the other hand, to place too great a valuation on what may be learned from the postmortem study of patients, but to attempt to reemphasize the fact that in spite of the chemist's investigations in a case, the visualizing by roentgenograms of internal changes and the study of cardiac activity by the polygraph and the electrocardiograph, as well as study by other precise methods, the vast majority of clinical diagnoses can be accepted or rejected only on the basis of naked eye, microscopic, chemical and bacteriologic examination of the body after death. Such control of diagnosis should serve as a stimulus rather than as a deterrent to rendering more exact the study of the living patient, and it is with the hope of furnishing such a stimulus that we present our case records.

Richard Cabot's[1] widely read article on "Diagnostic Pitfalls Identified During a Study of Three Thousand Autopsies" pointed out in very striking manner the factor of error in a list of twenty-eight special lesions and diseases. It occasioned resentment on the part of certain clinicians accustomed to the ex cathedra method of diagnosis, but in many others served to stimulate greater precision in methods of examination. It has also been used by unscrupulous persons to discredit the practice of medicine. Scientific medicine, however, is too firmly established to fear any such attacks and can only profit by the open mindedness and critical self-examination of occasional reviews, such as that of Cabot.

By fine examinations and strictest interpretations, the pathologic anatomist might demonstrate, perhaps, a greater percentage of error on the part of clinical diagnosis than is indicated by Cabot, particularly errors of omission, were he to include minor degrees of arteriosclerosis, slight sclerosis of heart valves, cloudy swelling of parenchymatous viscera, agonal congestion and other similar lesions; but fairness demands that he include only such apparent lesions as might reasonably be expected to present definite signs and symptoms in life. Such an attitude should be met in like spirit by the clinician, and studies such as the present one be accepted in the light of attempted friendly cooperation rather than in that of the bitter and destructive criticism all too frequently exhibited at the necropsy table.

Our studies are of 600 cases equally divided between two large hospitals in Cleveland. Our series is too small to permit of the same division as made by Cabot and still reach satisfactory percentages in some of the less frequent diseases. We have therefore decided to classify by organs and systems rather than by special lesions. There were, however, certain marked errors of diagnosis that defy any such classification. These we have classified as gross errors, and we have not included any instances in which the clinical diagnosis, even though markedly in error, was of the same organ found diseased at necropsy. We have included, however, certain very obvious errors of omission. This group numbers fifty of the 600 cases, or 8 per cent. As for the hospitals, in one there was 6 per cent. of such errors, and in the other, 10 per cent. A few examples serving to illustrate the type of error included in this group will be found in Table 1.

TABLE 1.—ILLUSTRATIVE EXAMPLES OF THE TYPE OF "ERROR OF OMISSION" IN CLINICAL DIAGNOSIS

Clinical Diagnosis	Pathologic Diagnosis
Lobar pneumonia	Cerebral tumor; no pneumonia
Acute endocarditis	Acute peritonitis from ruptured pustube; no endocarditis
Lobar pneumonia	Epithelioma of larynx; tuberculosis right upper lobe; no pneumonia
Typhoid fever	Lobar pneumonia
Carcinoma of stomach	Lobar pneumonia; no stomach lesion
Cardiovascular disease	Carcinoma of stomach
Cerebrospinal syphilis	Acute pyelonephritis
Acute alcoholism	Fracture of skull
Tuberculous meningitis	Bronchopneumonia
Aneurysm of descending aorta	Atrophic cirrhosis; rupture esophageal vein
Cirrhosis of liver	Lobar pneumonia; cloudy swelling of liver
Carcinoma of stomach	Pulmonary tuberculosis; amyloid liver and spleen; no lesion of stomach

We have classified as "minor errors" those in which the affected organ was properly diagnosed, thus including here the errors of commission. In addition, this group has been made to include the failure to observe lesions of the special organs. Many of these errors are not so serious as to justify inclusion in the "gross errors;" but in order to make the figures more accurate, it is necessary to include with each organ cases which also have been classified above as gross errors. We have compared the number of correct diagnoses to the total number of cases diagnosed, and have thus estimated the percentage of error of commission. It is to

* From the Department of Pathology, Western Reserve University School of Medicine.

* Read before the Section on Pathology and Physiology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

1. Cabot, R. C.: Diagnostic Pitfalls Identified During a Study of Three Thousand Autopsies, J. A. M. A. **59**: 2295 (Dec. 28) 1912.

be presumed, however, that if a patient is admitted to a hospital, a complete examination is made, so that the failure to discover a distinct lesion must be looked on as affecting the statistics of diagnosis as applied to the particular organ under discussion. We have included only those organs and parts of the body in which diagnoses have been made and pathologic lesions found in sufficient number to justify the percentage estimate of success. It is invidious to make comparisons between two hospitals in the same community, the staffs of which are made up of different visitants and house officers; but it is of interest to note that the percentage of error was practically the same in each institution, except in the case of heart and pericardial lesions. In respect to these, one hospital had a 74 per cent. error of commission, and a total error of 80 per cent.; whereas the other had a 41 per cent. error of commission and a total error of 52 per cent. Table 2 furnishes the data.

TABLE 2.—MINOR ERRORS

Organ or Part of Body	Cases Diagnosed	Correct Diagnoses No.	Correct Diagnoses Per Cent.	Cases Overlooked No.	Chance of Correct Diagnosis Per Cent.
Head and brain	72	43	60	7	54
Heart and pericardium	119	62	52	36	47
Lungs and pleura	174	95	54	77	38
Position of lobar pneumonia	68	25	37	12	31
Liver and biliary tract	30	17	57	17	36
Gastro-intestinal tract	66	36	54	8	49
Nonsuppurative nephropathy	60	46	77	72	34
Blood vessels	36	24	67	21	42
Totals for these organs	625	348	56	192	40

Certain notes in addition to the table are desirable. Most of the errors in the diagnoses of heart lesions were errors in regard to valves affected. The errors of omission in disease of the lungs and pleura do not include terminal pulmonary edema or slight, terminal bronchopneumonias. In regard to lobar pneumonia, the errors formed a sufficient number of the errors of pulmonary diagnosis to justify separate classification. The table does not show the fact that of sixty-eight cases in which the diagnosis was lobar pneumonia, twenty failed to show this disease, most of these cases being those of well marked bronchopneumonias. Certain errors of diagnosis in the gastro-intestinal tract are of interest. There were twelve cases in which the clinical diagnosis was carcinoma of the stomach, of which ten were correct; of the others, one was a case of pulmonary tuberculosis, and the second, one of peritoneal tuberculosis. Six cases of typhoid fever were correctly diagnosed and three incorrectly diagnosed, two being cases of generalized miliary tuberculosis, and one a streptococcus septicemia. In regard to the large number of cases of nonsuppurative nephritis overlooked, it is but fair to state that more than half of these were cases of chronic interstitial nephritis. In only six cases of other renal lesions were diagnoses made. Four were correct, namely, acute pyelonephritis, perinephric abscess, infected infarcts and tuberculous nephritis. There were, however, fourteen cases overlooked, all suppurative except one case of nephrolithiasis, so that the percentage of correct diagnosis in this small group is eleven. In the diseases of the vascular system there were not included as overlooked the many cases in which there was a minor degree of intimal sclerosis of the aorta.

If the total number of cases is added to the number of cases overlooked, the sum exceeds 600, the figure previously given as the total of the number of cases. This is explainable by the fact that there were combined lesions in numerous cases. This factor is more real than apparent, because numerous miscellaneous cases have been used simply as a percentage basis for ascertaining gross errors. Thus, the figures tabulated in Table 2 apply only to the organs and systems included in the table.

The data furnished refer to clinical histories filed in the two hospitals over a period of several years; and while they cannot be regarded as indicating the diagnostic ability of the visiting chiefs, they do represent the average or mean diagnostic ability of the clinics of these men, as indicated by the permanent records of their cases. The pathologist sees and feels things directly, whereas the clinician must, in many instances, interpret phenomena observed only indirectly; but both have the same facilities for making records, and it is fair to presume that in a given institution the records of clinic and laboratory are subject to much the same factor of completeness or incompleteness.

If clinical diagnosis in a large community, well and favorably known for its medical investigation and teaching, is subject to an 8-per cent. factor of gross error and a 60 per cent. factor of minor error, it is reasonable to suppose that similar chances of error exist in less favored communities. This cannot be interpreted as a failure on the part of the clinician to give his cases proper attention and therapy, for many of the minor errors disclosed had no influence whatever on the treatment of the case or its outcome. To differentiate all the cases in which the errors in diagnosis would influence the outcome presupposes a knowledge of the intricacies of natural adaptation to disease which science at present does not possess.

The improvement of clinical medicine depends, however, on increasing accuracy of diagnosis, from which a more rational therapy may be adduced. The exact benefit of improvement in the diagnosis and in the treatment of the diseases of man to his productive labor can be estimated only from morbidity statistics which have never been accurately tabulated for any large group of people. The improvement must be along lines of more exact clinical study, and can be properly controlled almost solely by recourse to the postmortem examination of carefully studied patients. The service of such examinations is not only to the medical profession but directly to the public, as has been emphasized by several writers, most notably, L. B. Wilson,[2] who points out their importance to vital statistics and to studies of heredity. The value of these to the public is great. The actuarial calculations of life insurance companies are based on vital statistics, based largely, in turn, on clinical diagnoses. Any constant error of clinical diagnosis is therefore reflected in such figures. If, therefore, the figures were placed on a more accurate basis, a more just charge for life insurance would be established. To these advantages of necropsies is to be added, as pointed out above, the probable increase in public health accruing from greater accuracy of clinical diagnosis. "The education of the medical profession by accurate postmortem diagnoses is a veritable safeguard for the public welfare."[3]

If the value of the necropsy is so well established, what is American medicine doing to further its own

2. Wilson, L. B.: The Necropsy as a Public Service, J. A. M. A. **64**: 1560 (May 8) 1915.

3. The Necropsy Situation in the United States, editorial, J. A. M. A. **68**: 783 (March 10) 1917.

advancement by control of clinical diagnosis? In the report of a committee of the New York Academy of Medicine in 1914,[4] it was pointed out that in a selected series of large hospitals in the United States the percentage of necropsies, as compared with the total number of deaths, was one eighth that in Canada, Great Britain, Austria and Germany. At that time, in only two hospitals was the number of necropsies above 40 per cent. of the deaths. According to Winternitz,[5] this number had increased in 1917 to include eight hospitals of twenty-two answering a questionnaire. He says, "Perhaps the selection of hospitals was fortuitous;" and, when one reads the list of hospitals, it seems that the assumption is correct. In this list of eight hospitals are included the Robert Brigham[6] and Cincinnati General[7] hospitals, with, respectively, 70 per cent. for two years and 63 per cent. for one-half year, periods too brief to indicate sustained interest in the matter. These figures indicate a distinct tendency toward improvement, proceeding, however, at a disappointingly slow rate. Indeed, one of the large hospitals in this city, during the year 1918, showed a reduction from an average of 40 per cent. over several years to 18 per cent., whereas the other increased from 13 per cent. to 15 per cent., both being affected in practically the same way by war conditions and the epidemic of respiratory infection.

CONCLUSIONS

Investigations of the cause of this general shortcoming of American medicine in studying the accuracy of clinical diagnosis lead to a variety of explanations and an equal variety of suggestions for improvement. The latter may be thus summarized:

There should be:

1. Education of the public as to the importance of postmortem examinations to public health.
2. Improvement of legislation: (*a*) obviation of the necessity for written permission to perform a necropsy, and (*b*) recognition of the difference between anatomic dissection and the necropsy.
3. Improvement of hospital regulations.
4. Increased development of the interest of physicians in the necropsy.
5. Encouragement of the "selfish interest in postmortems on the part of intelligent relatives of the dead."
6. Assignment, in large hospitals, of certain persons whose special duty it shall be to secure permission for postmortem examinations.
7. Information given the family as to the conditions disclosed by the necropsy.
8. A request for necropsy in every fatal case in hospital or private practice.
9. Establishment in the hospitals of regular clinical pathologic conferences.

We would suggest, in addition, that the subject is of direct importance to the development of industrial medicine and that those interesting themselves in this subject point out to employers and employees the value to medicine and industry of postmortem examinations. The suggested alteration of actuarial figures regarding life insurance is of similar importance to the so-called health insurance.

4. Oertel, Horst, and Lewinski-Corwin, E. H.: Report on Postmortem Examinations in the United States, by the Public Health and Budget Committee of the New York Academy of Medicine, J. A. M. A. **60**: 1784 (June 7) 1913.
5. Winternitz, M. C.: Autopsies—Their Value, Methods of Obtaining and Protection of the Hospital, Mod. Hosp. **8**: 36 (Jan.) 1917.
6. McCrudden, F. H.: Mod. Hosp. **6**: 376, 1916.
7. Woolley, P. G.: Mod. Hosp. **6**: 377, 1916.

ABSTRACT OF DISCUSSION

DR. FRANCIS CARTER WOOD, New York: It is necessary to be very frank in our discussions and to realize that neither medicine nor surgery is as yet perfect. The public is as well aware of this fact as we are. The only way to improve diagnosis is to follow our cases with the greatest care and to study our practical results and those of others. Failures in diagnosis are often due, not so much to lack of knowledge as to lack of thoroughness and care in examination. Too much reliance is placed on laboratory reports, which are popularly supposed to have an infallibility with which no laboratory man would credit them. One way in which to improve the treatment of patients is to have students in the hospital wards. In teaching them the physician teaches himself. The private practitioner must fall back on reading, on attendance at medical lectures and meetings, and on most careful and thorough study of his patients.

DR. W. CARPENTER MACCARTY, Rochester, Minn.: For a number of years I have been greatly interested in the comparative study of clinical and pathologic diagnosis. In justice to the clinician we must divide all errors into three groups, namely, actual errors, apparent errors and avoided errors. The actual errors are those which might affect the welfare of the patient by virtue of being misleading in so far as therapy is concerned. The apparent errors are usually those in terminology and may not affect the patient. The avoided errors are those in which the diagnosis is guarded by some general descriptive or localizing term. We must work with the clinician and not antagonize him. He must do likewise with the pathologist. I am not saying that Dr. Karsner criticizes him but I feel that his facts may be interpreted as criticism. I am associated with clinicians with whom I attempt always to consider one object, namely the patient. Much of the difficulty of clinicians has arisen from their attempt to utilize detailed pathologic terminology for clinical purposes. Pathology terminology as a means of communication of ideas is inefficient even for pathologists. If we do not change our attitude toward clinicians and patients the pathologic work of clinics will be done by laboratory girls who may be able to meet the emergency technically but who will be short on judgment. Our attitude should not be one of antagonism but one of strenuous attempt to give the patient the proper prognosis. I have lived with clinicians for twelve and one-half years. We have never had an argument and we have never had any trouble. The judgment from the laboratory is the last court as far as diagnosis is concerned. Pathologists throughout the world must take the same attitude. We have much to correct in our own specialty. We must first have our own conceptions of diseases clear and then utilize a simple and accurate code of communication of ideas. There is no uniform terminology in our textbooks. Much of our science is absurd, certainly ambiguous. It is inefficient, not only from a clinical standpoint, but from our own standpoint. We have to correct ourselves or our places will be taken by those not as scientically trained as we are. We must get into the game of rendering immediate service to patients. The game can be played only by means of team work and by diplomatic constructive analysis of our own faults and those of our colleagues.

DR. E. R. LE COUNT, Chicago: We should remember that the postmortem examination is a measure, for the most part, of things that are rather certain; lobar pneumonia, for example, is definite. When we compare such definite lesions as lobar pneumonia with the conditions that attend clinical diagnosis, it is a little hazardous because of the many varying factors which enter into clinical diagnoses, and one of these to be thought of always is the time element. How long has the patient been under observation? I do not think it is quite fair to any clinician to charge him with an error in diagnosis unless he has had adequate facilities for making a diagnosis including the time. There are many other factors. Dr. Karsner mentioned sclerosis of the heart valves. We all know how common it is to find sclerosis of the front mitral leaflet. It is practically constant in the later years of adult life, but hardly any of such scleroses deserve a place as diagnosable lesions. I have contented

myself so far, as far as possible, with showing the clinician what is present and avoiding any discussion as to why he did not make a correct diagnosis. Often such failure to comment is as effectual as a long drawn out discussion.

DR. HENRY A. ALBERT, Iowa City, Iowa: There is no doubt in my mind that we should place much more emphasis in the teaching of medical students on the importance of a knowledge of pathology, more especially gross pathology, than we do at present. The correlation of such with the clinical findings can be best brought out at the postmortem table. In this respect we are more fortunately situated than are many others. We are in a small community with a hospital of 500 beds entirely under the control of the hospital staff and practically all patients are clinical cases. About fifteen years ago, only about 25 per cent. of the cases which terminated fatally reached the necropsy table, whereas at the present time, the percentage is about 85. All our clinicians are interested in pathology. The rule at our institution is that necropsy work takes precedence over all other work. The clinicians have agreed to permit necropsies to be given preference, in point of time, to any other work. In case of necessity our clinicians are perfectly willing to give up a surgical or medical clinic, so that they and the students can attend the necropsy. For some years the clinicians and pathologists have compared notes. The students also make both clinical and pathologic examinations and compare the findings. These take place to a certain extent at the time the postmortem examination is made. The clinician is there and the essentials of the clinical history are presented. The pathologic conditions are noted and discussed. After the bacteriologic findings have been noted and microscopic examinations of the tissue specimens have been made by the students, all the pathologic findings are again discussed and the correlation between such and the clinical symptoms is again made. We have found such frank consideration of all of the findings of a given case to be very helpful.

DR. W. M. L. COPLIN, Philadelphia: I would like to ask Dr. Karsner if he could tell whether the errors in diagnosis were in cases used for teaching purposes.

DR. H. E. ROBERTSON, Minneapolis: I am in entire sympathy with Dr. Karsner's object in presenting this paper. However, I do wish to be cautious in allowing those who do not understand fully the difficulties of the practice of medicine to be placed in a position where they can critisise the medical profession by quoting from its own members criticisms which are not fully understood and often out of place. Our profession has many weak spots and we have been rather lax in attempting to correct these. The other day there appeared before our county medical society two laymen whose duty it was to call attention to the lax methods pursued by modern hospitals in the professional care of the patients under their charge. This fact appeared to me to be a very ominous sign and showed that we are in danger of having done for us by outsiders things that we should do ourselves. One point of attack on this problem which seems to me to be very important is on the teaching done in medical schools. In these students our hope must lie for the radical improvement of existing conditions and if we present these high ideals of practice and living properly, without radical revolution but by evolution, we may find many of the present evils corrected in one generation. Socialized medicine in some form or other is almost certain to overtake us. Wise criticism and planning may regulate this to the advantage of the profession as well as that of the public. Nowhere is this wise criticism so important as in the relation between the pathologist and the clinician, and the responsibility of the pathologist is often very great. I am inclined to think that at times, at least, the clinician needs sympathy and instruction rather than publicity.

DR. FRANCIS CARTER WOOD, New York: I think much of what has been said depends on the fact that we are working with an older group of physicians, men who have not the laboratory training of the last ten years. I feel, as Dr. Robertson does, that our educational ideals in the medical schools are not yet high enough in the sense of teaching the men the responsibility which they assume when they undertake the practice of medicine and the necessity of thorough investigations of individual cases. The reason for much of the slipshod work in diagnosis is that in their desire to take more patients physicians assume more than they can do well. The same thing is seen in the hospitals, where a man will see a large number of patients very superficially, but is unable or unwilling to spend a great deal of time with any one patient.

DR. H. T. KARSNER, Cleveland: The most serious criticism of the aims of this paper is that made by Dr. Robertson. I feel that nothing appears in the paper that should not be seen by the profession or the public and maintain that an intelligent medical or lay public can understand that the inaccuracy of clinical diagnosis is not a reflection on the medical profession but rather an indication of the need for improvement. Such improvement can only be attained through cooperation based on complete understanding of the situation. Concealment of these facts can lead only to regression. Dr. Robertson suggests that the necropsy can be employed as a means of indicating a man's diagnostic ability, but I feel that it reveals rather the limitations of diagnostic methods. In hospitals where consultations are freely employed the index is one of staff rather than individual. In reply to Dr. Coplin, most of the cases were used for teaching purposes both before and after death. Between the third and fourth year of medicine in Western Reserve University, there is only a three weeks' vacation period so that the clinical material is used throughout the year. In addition, the fourth year students, as clinical clerks, attend the clinical-pathologic conferences on the cases that come to necropsy. In reply to Dr. Albert, we hold clinical-pathologic conferences in both the hospitals used in this study, and in the fourth semisemester of the year we also hold similar conferences for the entire second and third year classes, in which the third year students present the clinical features and the second year students the pathologic features of the cases under discussion. In all these conferences any errors disclosed are traced as far as possible to the source with the idea of evaluating clinical and laboratory diagnostic methods. In reply to Dr. Le Count, we did not include cases which were in the hospital too short a time to permit reasonable clinical examination, and as stated in the paper did not include minor or agonal pathologic lesions which the clinician could not be expected to have diagnosed. I quite agree with Dr. MacCarty that there should be a standardized nomenclature in pathology but cannot agree that his device brings us materially nearer a solution of the problem. Pathology alone cannot settle the matter because the terms used are in most instances common to the entire field of medicine. We, as pathologists, have no quarrel with the clinicians. On the contrary, we stand in need of closest cooperation. Any disagreement that may occur are rather a battle between progress and reaction than a conflict between pathologists and clinicians. By our ability to see things directly as they occur in the body rather than through layers of skin, fat and other structures, we are in a position to verify or correct diagnoses made at the bedside. This difference should always be recognized and lead to harmonious discussion rather than acrimonious debate.

Vaccine Against Cancer.—Professor Rappin of the University of Nantes is director of the Pasteur Institute, and as early as 1886 he called attention to a micro-organism which he found constantly in cancer and has continued to find it since, although his research has been fragmentary. He has been recently experimenting with a vaccine made from this micro-organism and reports in the *Bulletin médical* of July 19, 1919, three patients with inoperable cancer treated with it. He considers the results encouraging, although his material was so small and not demonstrative. He gives illustrations of the micro-organism as seen in an alveolar cancer, hoping others will carry on the research more thoroughly. His previous communications were published in the *Gazette médicale de Nantes* and in the *Comptes rendus des séances et mémoires de la Société de biologie*, Dec. 10, 1887.

EXPERIENCES WITH DUODENAL FEEDING AT U. S. ARMY GENERAL HOSPITAL NO. 41 *

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At General Hospital No. 41, we have treated gastric patients returned to this country from duty overseas as well as patients from among the enlisted members of the detachment. Practically all of these patients had been under dietetic treatment before reaching our ward, but the symptoms were continuing in unabated form. It occurred to us that, rather than again subject the patients to a procedure that had failed to produce improvement, we would have recourse to Einhorn's duodenal alimentation. The underlying principle appeared to be rational, that through rest of the diseased area, by completely excluding it, nature might be given the opportunity of effecting recovery. Our results with this method have been encouraging.

We modified the duodenal tube in a few details. According to its original construction by Einhorn, as also in the modifications by Gross, Palefski and Rehfuss, there is a perforated metallic attachment at one end. We attempted to get rid of this metallic end-piece. It seemed possible that a metallic weight of that sort might, if left in contact with the soft lining membrane of the duodenum or jejunum over a prolonged period of time, produce an erosion with possible hemorrhage or ulceration. Especially might this occur where it would be desirable to keep the tube in place for as long a time as six weeks or more in the case of a chronic ulcer. We, therefore, had one patient swallow the rubber tube with no bulb attached. In this particular case the end of the tube actually passed through the pylorus into the duodenum (Fig. 1). But every other attempt failed, the tube coiling on itself within the stomach. A weight at the end of the tube seemed quite valuable in facilitating the passage of the tube into the proper place. We could not, however, understand the particular value of the weight once the tube had reached the duodenum, whereas the continued pressure might be a conceivable source of danger. We therefore sewed a bulb on the end of the rubber tube with plain catgut. The tube was swallowed by the patient that evening, and a roentgenogram was taken the following morning which showed the tube in place and the bulb detached and present in a different portion of the intestine. The catgut had been absorbed, permitting the bulb to escape (Fig. 2). Owing to the rapidity with which plain catgut is absorbed, we have been using chromicized catgut. In the case of another patient we sewed the bulb on with chromicized catgut. The roentgen-ray finding taken eighteen hours after the tube was swallowed is shown in Figure 3. In one case, the lumen of the tube became so occluded that food would not flow through. We, therefore, made several openings at varying distances from the end to minimize this possibility. The duodenal tube, as we use it, consists of 45 inches of thin, readily collapsible rubber tubing with several openings along the side, the openings being about as large as the lumen and located at different intervals for a distance of approximately 1½ inches from the end. Sewed with chromicized catgut to the end of the tube is a small perforated metal bulb, which eventually becomes detached and may be recovered from the stool.

Fig. 1 (Case of E. F. L., Pvt., Medical Detachment).—Fairly typical history of ulcer with positive roentgen findings, blood in the gastric secretion, and a blood stain about 1 inch in length on a string, 21 inches from the teeth. The patient on discharge had gained 15 pounds and had no complaints. The tube was swallowed with no bulb at the end, yet passed into the duodenum without coiling on itself. Other attempts to have a tube pass into the duodenum with no weight at the end failed, the tube coiling on itself in the stomach.

Fig. 2 (Case of G. C. B., Pvt., Medical Detachment).—In this case a bulb was sewed on with plain catgut to the end of the rubber tube. The tube was swallowed in the evening and the roentgenogram taken the following morning. As a result of the absorption of the catgut, the bulb became detached from the end of the tube, which had passed into the duodenum.

Fig. 3 (Case of E. A., First Lieut., M. C.).—Owing to the fact that plain catgut absorbed with such rapidity, so that in some cases the bulb became detached while still in the stomach, it was decided to use chromicized catgut. The arrow points to the bulb, which has become freed from the end of the tube to which it was originally sewed. The bulb was recovered from the stool about thirty-six hours after it was swallowed.

* Read before Hospital Staff, May 27, 1919.
* This work was conducted on the service of Major Frank B. Gummey, chief of staff, and his successor, Major Frank Harnden.

We have become impressed with the value of the drop method of feeding the patients as originally advocated by Dr. Morgan. Feeding with the syringe as proposed by Einhorn may produce distention, pain and nausea. In one case, it produced cardiac palpitation with flashes of heat; in another case, flashes of heat followed by a feeling of cold, evidences of a possible vasomotor disturbance. In the normal mechanism of alimentation the stomach, which, as one of its functions acts as a reservoir, from time to time forces some of the chyme through the pylorus into the duodenum. In duodenal feeding the stomach as a reservoir is eliminated. The food passes directly into the intestine with its comparatively small lumen.

That an increase in bulk at any one time may cause distention appears probable. Moreover, when feeding is done by the drop method, there is increased opportunity for the material to mix with the secretions and for greater consequent enzymic action.

of glass tubing into which one of the medicine droppers fits, a screw clamp and a container, all arranged as seen in Figure 7. The method is simple, practical and inexpensive. When available, a vacuum bottle as a container may be used to advantage.

As to the localization of the tube, we have found no method so satisfactory as a roentgenogram. Far from being unnecessary or unimportant, as is usually stated, we know of no better way of determining exactly the position of the tube and where the end of it is. Even if all other facts were to prove conclusively that the tube was in the duodenum, we should have no definite clue as to how far the end of the tube reached. Shall we judge by the length of tube swallowed? That is uncertain because the tube may coil on itself (Fig. 4). By injecting a suspension of barium through the open end of the tube by means of a syringe and taking the roentgenogram during the process, we have a complete column of barium outlining the tube. Within fifteen

Fig. 4 (Case of G. C. B., Pvt., M. D.).—An illustration of the fact that the length of tube swallowed gives no certain indication as to where the end is, as the tube may coil on itself.

Fig. 5.—One of the factors that may interfere with the proper flow of fluid through the tube, namely, a kinking of the tube without any actual obstruction.

Fig. 6 (Case of J. L., Corporal Inft.).—This picture, taken twenty-four hours after the tube has been swallowed, still shows the bulb attached to the end of the tube. It had been sewed on with chromicized catgut No. 4.

Not only the direct introduction of a bulk of material by the syringe method, but even an increased flow by the drop method may produce discomfort which often can be obviated by regulating the rate of flow and decreasing the number of drops per minute. The rate best suited can be determined only by a study of the individual case. Given slowly, drop by drop, there is less possibility of the food's accumulating in the duodenum and backing up toward the pylorus, thereby perhaps coming in contact with the ulcer we are attempting to treat. This contingency may also be minimized by attention to the patient's position in bed during the period of feeding. Referring to Figure 3, we see that the end of the tube is at the end of the transverse portion of the duodenum. In this case the patient was instructed to lie on his left side during the feeding so as to aid in draining the fluid away from the duodenum and toward the jejunum. Apart from the duodenal tube as described above, the rest of the apparatus we have been using consists of two pieces of rubber tubing, two medicine droppers, a 4-inch piece

minutes the plate is ready for inspection. In the case of a duodenal ulcer, it is important not only that the tube be in the duodenum, but that the end be sufficiently far removed from the diseased area to avoid all possible contact of the food with the ulcer. In one case a roentgenogram showed the end of the tube in the duodenum. It also showed an escape of barium from the part of the tube within the stomach. On removing the tube we found the opening from which the barium had escaped.

After the tube is in place, the following possible occurrences may interfere with the proper flow of fluid through it: The lumen may become occluded. To minimize this possibility several openings were made at varying distances from the end of the tube as described above. Another possibility is a kinking of the tube. This is shown in Figure 5. In this case the food material failed to run through by the drop method. It could, however, be forced through with a syringe. We were able to correct the difficulty by gradually pulling out several inches of the tube until

the food again flowed through with no obstructions. A third factor which may prevent the food from passing through is pylorospasm, the sphincter contracting on the rubber tube. On several occasions in the course of duodenal feeding the fluid failed to pass through. Attempts to force it through with a syringe were equally unavailing. We had the patients swallow some water, and within a few minutes the food again passed through by the drop method without the slightest difficulty. We believe a relaxation of a contracted pyloric sphincter may explain this result.

The material the patient is fed should be fluid, and of such a nature and such bulk as to give him a maximum degree of comfort, and at the same time supply him with a caloric value requisite to maintain his weight, and a sufficient amount of protein to keep him in nitrogen equilibrium. It is an interesting physiologic phenomenon that, fed in this way directly into the intestine, patients are able to retain their weight over a period of several weeks, during the entire course of the treatment. In maintaining a patient's weight, we have an added factor that is of value in healing the disease.

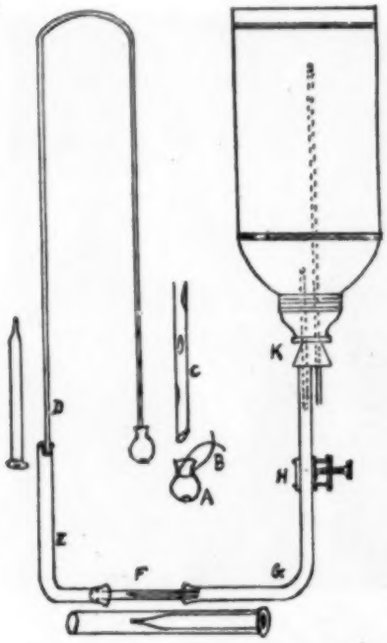

Fig. 7.—Outfit for duodenal feeding; *A*, perforated metal bulb; *B*, chromicized catgut; *C*, end of duodenal tube, with openings; *D*, medicine dropper; *E*, rubber tube; *F*, glass tube containing medicine dropper; *G*, rubber tube; *H*, screw clamp; *K*, vacuum bottle.

No definite feeding formula can be laid down. Each case must be studied individually. One must seek that happy combination of proper rate of flow, total bulk, and nature and concentration of food contained therein that will support nutrition with a maximum degree of comfort. An average mixture as we have employed it in our ward may contain 150 c.c. of peptonized milk; 70 gm. of glucose; 2 eggs, and 40 gm. of butter. In a patient, weighing approximately 60 kg., who is at rest, such a mixture given three times a day is sufficiently ample to sustain his body requirements.

The length of time the tube is permitted to remain in place must necessarily vary with the individual. To establish a definite period for all cases is to disregard obvious differences in healing power in different persons. This will vary with age, inherent recuperative power, as well as with the chronicity and severity of the lesion. To determine how effective the method of treatment has been, the patient is fed by mouth after a variable period has elapsed, while he is still being fed by the tube. In this way we have some means of judging the extent of recovery. As we find that we can increase the food by mouth, we eliminate one of the feedings by tube. Finally we dispense with duodenal feeding entirely and remove the tube. If we were to find that pain recurred on feeding by mouth, the tube still being in place, we could continue duodenal alimentation.

CONCLUSION

These points should be emphasized:

1. The importance of a duodenal tube with a weight at one end that is readily detachable shortly after the tube has reached the duodenum, and that has several openings near the end to minimize the possibility of occlusion.
2. The importance of the drop method of feeding.
3. The value of the roentgen ray for localization of the tube.
4. The conviction that we are dealing with a method that is not uncomfortable to the patient, as a rule, when properly handled, that we believe to be rational in its underlying theory, that enables the patient to maintain his nutrition, and that may prove of value in some cases.

ARACHIDIC BRONCHITIS*

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We have selected the term "arachidic bronchitis" to apply to a special form of bronchitis due to the aspiration of peanut kernels into the lower air passages. It doubtless should be applied also to analogous cases caused by the aspiration of a few other organic substances; but up to the present time relatively few cases caused by other substances have been observed; whereas, with peanut kernels, the cases have been so numerous and the evidence so overwhelming as to demand a place among the list of diseases affecting the bronchi and lungs of children.

There are only three references to "peanut bronchitis" that we have been able to find, one by Chevalier Jackson,[1] another by Ellen J. Patterson,[2] and a third in the Mütter Lecture for 1917,[3] wherein the visible living endoscopic pathology of arachidic bronchitis is discussed under the name peanut bronchitis.

DIAGNOSIS

The resemblance of the symptoms to those of laryngotracheal diphtheria is sometimes most striking, and in a number of cases antitoxin had been administered, though laryngeal smears and cultures had shown no *Bacillus diphtheriae*. There is in all of the cases a varying degree of dyspnea and restlessness which is usually more marked in the younger children. It was noted that the cases of peanut bronchitis show a marked toxemia, which we ascribe to the absorption of toxins from the difficultly expelled lung secretions. This toxemia resembles that seen in the acute infections, and is at times accompanied by a mild delirium. There is a marked difference between this toxic condition produced by the peanut and the purely septic condition which is seen in cases in which there has been

* Read before the Section on Laryngology, Otology and Rhinology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

1. Jackson, Chevalier: Peroral Endoscopy and Laryngeal Surgery, St. Louis, Laryngoscope Company, 1914, pp. 238, 261, 262, 393, 394, 396.
2. Patterson, Ellen J.: New York M. J. **109**: 101 (Jan. 18) 1919.
3. Jackson, Chevalier: Observations on the Pathology of Foreign Bodies in the Air and Food Passages, Surg., Gynec. & Obst. **28**: 201 (March) 1919.

a prolonged sojourn in the bronchus of substances of other than vegetable nature.

A dusky cyanosis is often present, but in the bronchoscopic clinic it has often been noticed that in children who have been fighting for air for a rather prolonged period of time, from any cause, this duskiness often is superseded by an intense pallor, the result of the excessive heart strain incident to the strenuous efforts of the muscles of respiration. This pallor frequently causes a false sense of security on the part of the attendant, who is accustomed to associate urgent dyspnea with cyanosis; and tracheotomy has often been performed too late, even though the cardinal signs, retraction of the suprasternal and supraclavicular fossae, and of the lower ribs and epigastrium, have been present the while. Distressing cough is a constant symptom; in the older children it is often paroxysmal and associated with the expectoration of a pinkish-gray, thick, tenacious, purulent sputum, which is very difficult to dislodge from the air-passages.

The clinical chart shows an irregular, septic type of temperature elevation; and the heart rate and the respiratory rate are usually higher in proportion than the temperature, as would be expected when we consider the restlessness and the dyspnea present (Fig. 1). The physical signs reveal a generalized diffuse bronchitis, with an accentuation of the signs at the site of the foreign body. The asthmatoid wheeze[4] is present in the large majority of the cases. This is a wheezing sound of a dry character, heard by placing the ear at the open mouth of the patient and requesting him to make a forced expiration. The wheeze persists after practically all secretion has been coughed out of the air-passages, and is often so loud as to be audible across the room. The patient rarely loses the voice, a point which may aid in the differentiation from laryngeal diphtheria.

Inspection of the chest will usually reveal a lessened expansion on the side of the foreign body; percussion, an impairment of resonance, and auscultation, a diminution of the intensity or absence of the transmission of the breath sounds and voice sounds in that portion of the lung distal to the foreign body. These signs may be definite enough to warrant a localization of the intruder in a certain bronchus. Loud, bubbling, sonorous and sibilant râles are heard throughout the chest; these are, however, often of greatest intensity over the site of the foreign body. In some of the cases the marked dulness in the lower portion of one side of the chest, together with the absence of breath and voice sounds, has been interpreted as fluid in the pleural sac, and exploratory punctures, and even rib resections, have been made, only to find the pleura normal and no unusual amount of fluid present. A roentgenogram is invaluable in confirming the signs and evidences of a pathologic condition (even though the foreign body itself rarely makes a demonstrable shadow) and it will with certainty rule out empyema.

4. Jackson, Chevalier: A New Diagnostic Sign of Foreign Body in Trachea or Bronchi, the "Asthmatoid Wheeze," Am. J. M. Sc. **156**: 625 (Nov.) 1918.

Next to diphtheria, the disease most likely to be confused with arachidic bronchitis is infective laryngotracheitis, especially the epidemic forms called influenza and the "grip." In these cases the symptoms will often clear up if the secretions are alkalized by the administration of sodium bicarbonate. In other cases, only the bronchoscope will decide. A careful inquiry into the history of the onset, and a finding of whether or not an epidemic has been present and of whether or not the little patient has had access to peanuts should aid in the diagnosis. It may be mentioned that there are cases of influenza in children requiring bronchoscopy to prevent the little patients from drowning in their own secretion, in the same manner as in some of the cases of arachidic bronchitis.

We should always remember the possibility of peanut bronchitis when consulted regarding a child who rather suddenly develops irregular fever, restlessness, dyspnea with cyanosis, paroxysmal cough, and the signs of a diffuse, generalized bronchitis, attended with wheezing respiration. A history of choking on a peanut, or of eating peanuts at about the time of inception of the illness, renders the diagnosis almost certain.

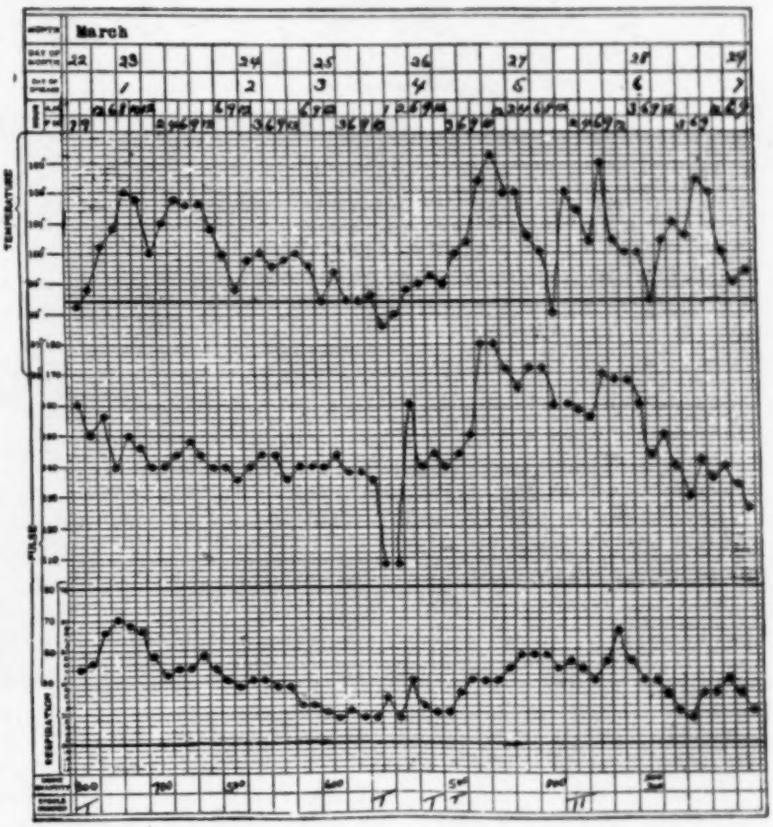

Fig. 1 (Case 2 [Fbdy. 647]).—Portion of a temperature chart in a case of arachidic bronchitis; girl, aged 4; peanut in the right lower lobe bronchus for three days.

ETIOLOGY

Age.—One factor in etiology definitely established at the bronchoscopic clinic is that relating to age. No cases have been observed in adults. It may be assumed that this is partly because adults do not aspirate peanuts; if they did, symptoms would follow bronchial obstruction no matter what the substance, and it is reasonable to assume that at least a few such cases would have come to the bronchoscopic clinic. The

reaction in children is so diffuse as to indicate an etiologic factor independent of obstruction. Be the reason what it may, the fact remains that the only cases of arachidic bronchitis that have come to the bronchoscopic clinic have been in children. A closely related fact is that the severity of the symptoms has been in inverse ratio to the age. Other data and observations on etiology will be considered under pathology.

PATHOLOGY

All of the peanuts aspirated had been roasted, so that it has not been possible to determine clinically whether the intensely irritating quality is lessened or increased by the action of heat on the raw tuber. Judging by analogy in similar organic materials, we may infer that the property of irritation is possessed by the raw peanut also, for violent diffuse tracheobronchitis was produced in several cases by the aspiration of walnut kernels and unroasted coffee beans. In one case, a pistachio kernel in the bronchus produced the identical symptoms of peanut bronchitis. A kernel of corn (maize) also acted in a similar manner, although the general reaction and evidences of toxemia were not so marked as in the peanut bronchitis. The peanut, however, seems to be peculiarly toxic when retained in the lower respiratory tract, and various explanatory hypotheses have been suggested by W. M. L. Coplin:[5]

(*a*) The action on the mucosa of irritating chemical substances present in the peanuts, either naturally, as in ricin in the castor bean, or developed in the process of roasting. The peanut contains 25 per cent. of protein, of which two globulins have been isolated —arachin and conarachin. Conarachin has the outstanding characteristic of containing more basic nitrogen than any other seed protein. Arachidic acid, a saturated fatty acid, is present in about 5 per cent. strength in peanut oil.[6] A fruitful field for investigation is open in the testing of the individual substances in the bronchi of animals.

(*b*) Is the reaction the result of the presence of an alien protein parenterally introduced?

(*c*) Does the porous organic vegetable protein afford a protective matrix for the proliferation of bacteria, the bacterial growth liberating toxins or acquiring virulence to enable the organisms to attack the living tissues?

"Peanut thresher's fever" is well known to practitioners in the districts where the peanut is grown. Whether it is due to particular qualities inherent in the peanut plant and its tubers, or only to the great clouds of dust, acting simply as a multitude of foreign bodies, is a question on which we could get no information in medical literature. It has been observed by members of the dental profession that some teeth are more sensitive to peanuts than to sweets.

The endoscopic living pathology is evidenced as an edematous, generalized, purulent bronchitis, with accentuation of the morbid processes at the site of lodgment of the peanut kernel. In one of the cases, patches of exudate were seen, and in all of the cases there was a copious secretion of thick pus, which sometimes was so abundant as to drip from the bronchoscope. The degree of reaction to the foreign body varies with the age of the patient; the younger the child, the more severe the reaction. In three cases in which we were not permitted to do a bronchoscopy, the patients died within two weeks. From the reports in these cases, as well as from observations in the nearly fatal cases that came in early enough for the patient to be saved, it seems evident that the younger children succumb after a short time from exhaustion incident to their constant fight for air and their bechic efforts toward the expulsion of the pus; or from toxemia produced by the absorption of the toxins of the retained purulent lung secretions; or, probably, from both combined. In older children, if the peanut is not removed, lung abscess develops in the portion of the lung distal to the foreign body. Removal of the foreign body, if the general condition of the patient is not too serious, is usually followed by a prompt subsidence of the dyspnea and cyanosis; the secretion loses its tenacious character, becomes more fluid and easier to expel and, in a few days, grows mucoid, greatly lessened in amount, and shortly ceases. The fever leaves in a little time, and the patient shows continued improvement in his general condition almost from the moment the peanut kernel is removed.

It is important to note that in all our various foreign body cases in which, prior to admission, the pleural cavity had been explored by puncture or by rib resection, no evidence of a pathologic condition was found. The impairment of resonance and the diminished transmission of breath and voice sounds are due, we have believed, to the accumulation of secretions in that part of the lung distal to the foreign body which is obstructing the bronchial drainage. To this condition, at the suggestion of Dr. George C. Johnston, we have applied the term "drowned lung," the pus being in the bronchi, to distinguish it from lung abscess, in which more or less of a pathologic cavity contains the pus (Fig. 2).

TREATMENT OF PEANUT BRONCHITIS

Having by history, physical examination and roentgenographic study made the diagnosis of peanut bronchitis, the physician should place the patient, as soon as possible, under the care of an endoscopist. The possibility of the kernel being coughed up is very doubtful, because, owing to its small size, it is usually drawn quite deeply into the bronchial tree, lodging in one of the smaller divisions, in which the expulsive force is limited; the edematous swelling of the bronchial mucosa tends further to fix the intruder. The longer the peanut kernel remains in situ, the greater the damage it produces, so that delay, with the hope and expectancy of the kernel being spontaneously expelled, should never be considered.

If the child is in good condition and but little dyspnea is present, immediate bronchoscopic removal of the peanut will in but a short time completely relieve all symptoms. The after-treatment of peanut bronchitis is largely nursing and providing the patient with an abundance of fresh air.

If, on the other hand, urgent dyspnea is present, and the child is obviously unable by bechic efforts to rid the air-passages of the thick secretions, tracheotomy should be performed. It is wise to do the tracheotomy early and not wait for the signs of exhaustion and intense toxemia, which may render the operation ineffective. Removal of the peanut at this stage would not relieve the dyspnea caused by the edematous laryngotracheobronchitis, although the pus accumulation

5. Jackson, Chevalier: Surg. Gynec. & Obst. **28**: 201 (March) 1919.

6. From chemical data kindly furnished by Prof. P. B. Hawk, Department of Chemistry, Jefferson Medical College of Philadelphia. Arachidic acid was suggested as a possible irritating factor by Jacob Rosenbloom.

could be thus removed. Furthermore, the insertion of the bronchoscope through the already damaged larynx would probably precipitate the tracheotomy. The tracheotomy will relieve the dyspnea and allow the removal of the secretions, and thus will lessen the toxemia.

After the tracheotomic wound has sufficiently granulated and the patient has recovered from the fatigue and exhaustion accompanying arachidic bronchitis, the peanut can be removed by bronchoscopy through the mouth. Passing the bronchoscope through the tracheotomic wound has decided disadvantages, and is never practiced in my clinic, even when, as in these arachidic cases, the tracheotomy has already been performed for dyspnea and drainage of the bronchi. It is important in the dyspneic cases not to use general anesthesia for either the tracheotomy or the bronchoscopy; for as soon as the patient loses consciousness, the action of the voluntary muscles of respiration ceases and the patient immediately stops breathing. Morphin is also contraindicated because it paralyzes both the respiration and the cough reflex.

ANALYSIS OF SOME RECENT CASES

An analysis of sixteen recent cases in which portions of peanut kernel had been removed from the bronchi is rather interesting. The oldest patient was aged 6, and the youngest 17 months, the average age being 3 years. The mortality was 17.6 per cent.—all the fatal cases being in the younger children, the oldest of these being 23 months and the youngest 17 months of age. There was no reason to believe that the mortality was due to the bronchoscopy, as these patients were admitted in extremely bad condition. The mortality in bronchoscopy for metallic substances is practically nil. Thirty-five per cent. of the cases of arachidic bronchitis required tracheotomy to relieve the urgent dyspnea, which is a constant symptom, varying in degree, but present in all of the cases, and to facilitate the ridding of the air-passages of the thick, tenacious secretion which the child is unable to expel through the impaired glottis. The tracheotomy was not performed for the purpose of inserting the bronchoscope, so-called lower bronchoscopy, for in all the cases the bronchoscope was inserted through the mouth, and the foreign body so removed. The longest time of sojourn of the peanut kernel in the bronchus was forty-eight days in a child, aged 2½ years, who recovered; the shortest stay was one day in a child of 17 months; and in this transient period the reaction was so great that the little one succumbed.

It is seen that all of the cases occurred in children, and that the younger the child the more severe was the reaction to the foreign body, and the more doubtful the outcome. Prompt tracheotomy, when urgent dyspnea is present, is a life-saving measure, for even after the peanut is removed the edematous laryngotracheobronchitis does not immediately subside; and being unable to expel the thick, tenacious secretion through the glottis, the necessary cooperation of which, in the bechic cycle, is impaired by the subglottic edema, the child is drowned in its own secretions.

The longer the stay of the peanut in the air-passages, the greater is the reaction. The resistance of the older children is relatively stronger; but a prolonged stay will in any case result in lung abscess which, unrelieved, is fatal.

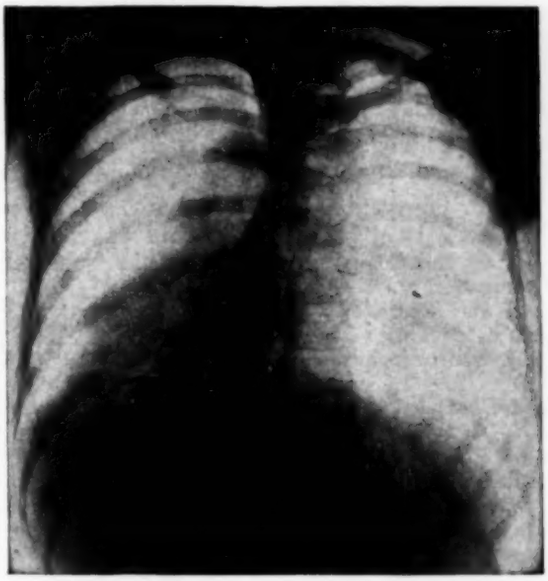

Fig. 2 (Case Fbdy. 444).—Drowned lung resulting from the blocking of a branch of the left inferior lobe bronchus by a pistachio nut; note sharp limitation of the involved area.

REPORT OF CASES

The following cases were selected from our records as typical of the varying degrees of reaction resulting from the aspiration of peanut kernels:

CASE 1 (Fbdy. 347).—A boy, aged 1 year, 11 months, thirty days before admission, was eating peanut candy when one of his older playmates slapped him on the back and caused an intense choking and coughing attack. On the next day the patient developed a severe cough and had a temperature of 104 (rectal), which lasted two days and then returned to normal. The temperature became elevated six times in a month and, after a few days, would return to normal. During the intervals of normal temperature the child coughed severely but would play with his toys, becoming very ill at other times. He lost rapidly in strength and weight. On admission it was noted that he looked ill and had dark, hollow circles under his eyes. His temperature was 104. A physical examination by Dr. John W. Boyce disclosed the respiratory movement of the right side to be almost abolished. The left side appeared fuller than the right. The percussion note was impaired, almost dull all over the right side, the impairment increasing toward the base. Breath sounds over the right upper chest were loud and harsh, but diminished in intensity over the lower lobe. A few small and medium moist râles were scattered over the right side. There was severe paroxysmal coughing, and the breathing was labored and accompanied by wheezing which could be heard across the room. Some cyanosis was present, and the patient's general condition was extremely poor.

The roentgenogram showed shadows over the right chest, although the impairment of resonance was greater than the density of the shadow would have indicated. The roentgenographic report (by Dr. George C. Johnston) was: "Decided evidence that right lower lobe bronchus is plugged. Left clear. Distinct shadow over right lower lobe, opaque enough for pus."

Without anesthesia, local or general, a bronchoscope was introduced, and a large amount of foul pus and slough was removed and an abscess cavity evacuated, after which a portion of peanut kernel was found lodged in the right lower lobe bronchus and removed. Only transient improvement followed. The air-passages were again quickly filled with pus, and urgent attacks of dyspnea and laryngeal spasms occurred. A tracheoscope was inserted through the mouth, and a number of sloughs which had lodged in the subglottic region were removed by means of it. The laryngeal spasms then subsided. One of the sloughs was ringlike and was considered a part of a bronchial wall. The dyspnea again recurred, however, owing to the copious outpouring of pus

and the inability of the child to expel it, so that a tracheotomy was performed which, aided by careful nursing, relieved the dyspnea. There was a slight improvement in the lung condition, and the patient was discharged to his home with the hope that an antituberculous regimen would restore the damaged lung; it was reported, however, that no improvement followed, and that the child died two months later.

The interesting points of this history are:

1. The prompt reaction to the foreign body, as evidenced by the temperature of 104 within twenty-four hours.
2. The intermittence of the symptoms; probably accounted for by wedging of the peanut kernel at times in the bronchus, and by the accumulation of secretions and the toxic absorption therefrom; succeeded, in turn, by the dislodgment of the foreign body for a time, possibly by the pressure upward of the accumulating secretions, a subsidence of temperature occurring after the drainage of the drowned lung.
3. The progressive failure of general health.
4. The excessive quantity of pus and the difficulty with which children expel it.
5. The relief afforded by tracheotomy in the lessening of the dyspnea and in the removal of secretions which the child could not expel through the larynx.
6. The extensive destruction of lung tissue by abscess formation, which rendered the removal of the exciting cause—the peanut kernel—unavailing.
7. The fatal outcome resulting from the prolonged retention of the peanut kernel in the bronchus.

Case 2 (Fbdy. 647).—A girl, aged 4, brought to Jefferson Hospital, had choked while eating peanuts three days before admission, and had become very cyanotic for a period of about half an hour. Within twenty-four hours a severe cough and fever developed, and urgent dyspnea with cyanosis prompted the mother to consult a physician, who introduced bougies into the esophagus.

On admission there was urgent dyspnea and a purplish cyanosis; the child was extremely toxic and mildly delirious. Smears made from the larynx showed organisms resembling the diphtheria bacillus. A thick purulent secretion was seen in the larynx but no membrane. Diphtheria antitoxin was given, and tracheotomy was immediately performed, in order to relieve the dyspnea and allow the removal of the secretions. The dyspnea was relieved, but recurred frequently, owing to the accumulation of the tenacious pus, and necessitating frequent removal of the cannula and wiping of the secretion from the trachea.

A physical examination by Dr. E. E. Graham revealed a generalized bronchitis, with a small area of consolidation at the left apex posteriorly. A roentgenographic study by Dr. David R. Bowen disclosed a marked peribronchial thickening on both sides, but no pathologic shadows which would warrant his saying that in any one spot there was a foreign body. Later bacteriologic reports from cultures were negative for diphtheria bacilli. It was decided not to perform a bronchoscopy at this time because of the marked improvement following the tracheotomy, and because of the indefiniteness of the physical signs and the roentgenographic examinations, which rendered doubtful the presence of the peanut. The tracheotomic cannula was removed after three weeks. On the day following the removal of the cannula, the patient again became dyspneic and cyanotic and seemed unable to expel through the larynx a thick, yellowish, tenacious sputum. The tracheotomic wound was reopened and the cannula reinserted; but with such slight improvement of the dyspneic signs that bronchoscopy was decided on. It was done through the mouth and after removing a large amount of the secretion by bronchoscopic sponge-pumping a portion of peanut kernel was found in the right lower lobe bronchus and removed. No anesthetic was used, and the operation required five minutes and twenty-six seconds. Continued improvement followed; the secretion became more fluid and finally ceased; the tracheotomic cannula was removed, and the patient was discharged well.

The resemblance to laryngeal diphtheria in the early symptoms in this case is noteworthy, and the life-saving effect of the tracheotomy is well illustrated, for the symptoms partly subsided under the increased drainage and relief from dyspnea afforded. The prompt recurrence of the symptoms on removal of the cannula is a further proof that much of the disturbance is due to retention of the viscid secretions and to absorption of toxins therefrom.

Case 3 (Fbdy. 448x).—A girl, aged 6, was referred with the statement that twenty-four hours previously a peanut kernel had been aspirated. Much coughing and choking followed the accident, and within twelve hours the temperature was 102, respirations 42 and pulse 126. On admission the face was flushed and there was some dyspnea. The pediatrician, Dr. H. T. Price, reported a severe bronchitis on both sides, worse on the left. A roentgenographic study was not obtainable.

Bronchoscopy revealed all the air-passages filled with blood-stained pus: A portion of peanut kernel was removed from the orifice of the left upper lobe bronchus, and was followed by a gush of pent-up pus. The little patient was discharged well four days later.

The peculiar, irritative action of the peanut kernel is well exemplified by the prompt reaction noted in this case, as well as by its equally prompt subsidence on the removal of the peanut. It is also to be noted that the child was older and therefore more resistant to the pathogenic agent, whatever it may be, inherent in the peanut kernel.

Complete detailed reports of other cases will be published subsequently.

CONCLUSIONS

1. The aspiration of peanut kernels into the bronchi of children causes a definite syndrome which we term arachidic bronchitis.
2. There seems to be some inherent property in the peanut rendering it far more irritating than other forms of foreign body in the bronchi.
3. The instances which we have seen of this arachidic bronchitis have all been in children, and the younger the child the more severe was the reaction.
4. The pathologic condition consists of an edematous, purulent, laryngotracheobronchitis which, if not fatal, results in lung abscess.
5. The symptoms are due to (*a*) the swelling of the mucosa of the air-passages, resulting in dyspnea and cyanosis, and (*b*) the accumulation of the difficultly expelled purulent lung secretions, and the absorption of toxins therefrom, which results in fever and other signs of toxemia. The condition must be differentiated from laryngotracheal diphtheria and influenzal laryngotracheobronchitis.
6. The prognosis is grave if the peanut is not removed. The younger children succumb quickly to exhaustion and toxemia. If the peanut is promptly removed, convalescence is usually rapid. Resistance in the older children renders the course more protracted, but lung abscess ultimately results.
7. The treatment consists in early bronchoscopic removal of the peanut in the cases in which there is only slight dyspnea. In cases in which dyspnea is marked, tracheotomy may be required to pipe air to the lungs and to facilitate the removal of the viscid, puru-

lent secretions, a bronchoscopic removal of the peanut through the mouth to be effected as soon as the wound has sufficiently granulated.

8. The number of the cases and the definiteness of the symptoms, together with the serious nature of the reaction, warrant the inclusion of arachidic bronchitis among the diseases affecting the lower respiratory tract of children.

1830 South Rittenhouse Square.

ABSTRACT OF DISCUSSION

Dr. Edwin E. Graham, Philadelphia: What I have to say will be purely from the standpoint of the pediatrist. Perhaps it would be well for me to give you the impression I had on seeing my first case. An infant was suffering from inspiratory dyspnea, a typical case. The child was more or less cyanosed. Inspiratory dyspnea to the pediatrist means what it would to the laryngologist, obstruction of the larynx, and I thought of laryngeal diphtheria. I asked the intern whether he had made a smear. He had. A culture? Yes. Had he given antitoxin? Yes. But Dr. Jackson had told him that this child had inhaled a peanut. On closer examination I found well marked bronchitis in both lungs, which we do not get in laryngeal diphtheria; I found this child was toxic and running an irregular temperature, which we do not have in laryngeal diphtheria. In laryngeal diphtheria the toxemia and temperature come late. The child had only been sick twelve hours, which certainly suggested laryngeal diphtheria. In peanut bronchitis the voice is husky, rarely lost as in membranous croup. The lung symptoms were more or less localized in one portion of one lung and although it is not always possible by auscultation and percussion to locate the peanut, still you can make a guess as to where the peanut is in a fair proportion of cases. The peanut commonly does not make a shadow with the roentgen. ray. One of the symptoms which impressed me most was the constant and persistent cough, evidently due to the large accumulation of thickened mucus to which Dr. Jackson refers and which is distributed throughout both lungs. When one understands the pathology, and the fact that this child is suffering from laryngitis, tracheitis and bronchitis, of course the symptomatology is clear, but as far as I know the books on pediatrics do not discuss peanut bronchitis, and when Dr. Jackson tells us that this is the third paper that has been read on the subject, perhaps we are to be excused. Certainly, the literature on the subject has been so scant that neither the laryngologists nor pediatrists have known much about it. The younger the child the more severe are the symptoms and in the infant under two years of age the symptoms developed in a few hours. A history of choking with severe dyspnea and possibly eating peanuts helps in the diagnosis. Tracheotomy in the infant is often necessary and does much good.

Dr. Thomas Hubbard, Toledo, Ohio: I have encountered cases of peanut bronchitis and also of pneumonia and have attributed the causation to a saprophytic infection—peanuts are very often moldy—and also as to the other infections. The peanut has usually been subjected to more or less mastication and coincident mouth infection may be carried into the bronchi. Another factor which I have thought was important in causing the violent bronchitis which often follows aspiration of a peanut is the fact that the child who aspirates the peanut has been eating peanuts. There are many small fragments of peanuts in the mouth and undoubtedly at the time the peanut is aspirated the small fragments find their way into the smaller bronchi. Probably the attack of coughing is primarily due to a small piece or pieces being inhaled and the larger mass is then aspirated. This was impressed on me at a necropsy made years ago on a patient who died a few hours after the onset of a double pneumonia. We found small fragments of peanut scattered through the smaller bronchi on both sides. It is these little fragments which probably account for the pneumonia in this type of case. As to peanut bronchitis in adults: A patient came to me on account of bronchitis of about a month's duration. Nothing was said about a foreign body. I examined her and located a one sided bronchitis; then, in a routine way, I asked her if there was any possibility of foreign body aspiration. She remembered that about four weeks before she had choked on a peanut, but she said she had coughed up the skin of the peanut and thought that was the end of it. It is interesting also to mention that she arranged to go to the hospital the next day, but that night she coughed up the peanut.

Dr. John W. Murphy, Cincinnati: I have had several cases of peanut bronchitis in children, and in each the history has been that the child was eating peanut candy, and I suppose that would account for the child having peanut fragments in the bronchi. I have always been impressed with the small size of the foreign body. It seems almost impossible that a very small portion of peanut could produce the intense bronchial symptoms manifested in these cases. A child, six years of age, aspirated a peanut and it was removed with much difficulty three or four days later. The following day the child seemed to be doing nicely. I went into the next room, and in fifteen minutes the nurse came running in and said, "the child is dying." I found the child in a state of complete collapse. What had happened? There had been an excessive secretion of rather thick mucus which had suddenly come up into the trachea and the child had suffocated, almost the same as if a large body had been inspired suddenly. A rapid tracheotomy was done. The trachea was completely occluded by the foreign body. Even though we passed the bronchoscope several times and succeeded in removing a substance considerably larger than the ordinary foreign body found in such cases, it proved each time to be inspissated mucus.

Dr. H. P. Mosher, Boston: Dr. Jackson said tracheotomy is dangerous in these cases. I would like to ask him why. Also why he condemns the use of morphin in those cases where we think it necessary.

Dr. Fenton B. Turck, New York: Dr. Jackson has taught us that bronchially lodged foreign proteins do not produce reaction. Therefore, meat and bone do not produce this reaction of pneumonitis even though infected, but if a foreign body reaches the bronchi and causes destruction of the tissue by cell digestion, it produces this reaction of pneumonitis. If meat is cooked it has no particular effect in the bronchi but substances which cause rapid tissue destruction or substances containing ferments which digest the tissue produce this reaction of pneumonitis. We are dealing not alone with a foreign agent but with autolyzed tissue products producing their own reaction in the body. Dr. Jackson has shown by his clinical observation and experimental work that tissue autolysis produces what we now call bronchopneumonia, bronchitis and similar conditions under a variety of names.

Sir St. Clair Thomson, London, England: Of course, we all recognize that in these matters we may say of Dr. Jackson as Michael Angelo said of Titian, that he eclipsed all his predecessors and sterilized all his successors. I came here, like Dr. Mosher, without a dictionary, and I have just written here to Dr. Dean, "I am ashamed to say that I do not know what 'arachidic' means." It was therefore a great relief when Dr. Graham came to my rescue by calling it "peanut bronchitis," because I really only understand English. There I feel at home. We do not have peanuts in England; we call them "monkey nuts." Also, our children are not so advanced as are your children. We do not feed them monkey nuts. Dr. Graham said he saw an infant with inspiratory dyspnea. Of course, I do not know what the limit of infancy is in this country, I should judge it would be about three weeks. In England we short petticoat a child at the end of four months, but here I suppose it is a full grown adult at that time. We also feed them with milk or some simple diet; here it seems to be peanuts and chewing gum. Evidently, also, they do not require teeth, as Dr. Hubbard said that in his case the peanut was not sufficiently masticated. Of course, it was from America that we learned about fletcherizing our food, but evidently infants are not taught it. Now, coming to what interests us, I hope I gather correctly from Dr. Jackson that if the patient does not have sufficiently localized symptoms, and yet the symp-

toms are serious, he does a tracheotomy. I would like to know whether after the tracheotomy he follows the ideas of one of our British statesmen, does he wait and see? Because I think in many of these cases, if there is no urgency and a tracheotomy is done, we should wait and see. We ought to give Nature a chance, although I do not think that in America Providence has much to do with it, you are generally ahead of Providence; still there is such a thing as self determination even in the human body, and after Dr. Jackson has done his tracheotomy, in order to live up to his ideals, does he wait until the tracheal wound closes before he goes in through the mouth? I did not quite follow him. If he goes in through the mouth with a tracheotomy wound in the neck, it seems to me like a burglar, who, going into your basement and seeing in the cellar some things he wants, goes around to the front door and down to the cellar when he might easily have gone down from the basement. But whatever Dr. Jackson insists is the fact, whether he defends his own position, as no doubt he will do, I still feel that there are many like myself who must agree that a good deal of Dr. Jackson's advice is, as the poet says, "Too wise and good for human nature's daily food."

DR. CHEVALIER JACKSON, Philadelphia: The paper spoke very learnedly about physical signs, but for brevity's sake I omitted the names of the different men who are responsible for those physical signs, as you probably know that I could not tell you on which side a pneumonia was, by my own individual auscultation and percussion. It is only by association with Drs. McCrae, Graham, Boyce, Price and others who have worked with me that I am able to give a résumé of what the physical signs have been in the cases of arachidic bronchitis. Dr. Hubbard's point is worthy of consideration. He spoke of peanuts being of septic character from being chewed in the mouth. That is equally true of fragments of teeth and other dental objects, and especially of bones, which are of all foreign bodies in the bronchi the most putrid, yet they do not produce more than a localized reaction. A patient's temperature will not rise and there will be no particular illness from aspirating a piece of bone if it does not obstruct drainage. Therefore it cannot be true that it is infection carried from the mouth produces the peanut reaction. In regard to there being a multiplicity of fragments, we have reason to doubt that this is the causative factor in the reaction that is produced by the peanut. We have had many cases in the hospital going along day after day with a temperature of 103 or 104 F. While we are deciding whether or not to use the bronchoscope, but finally, introducing the bronchoscope, we have taken out a piece or two of peanut, and immediately the temperature has fallen and the patient promptly recovered. If it were unremovable multiple fragments in minute bronchi instead of one fragment in a larger bronchus, the patient would not have gotten well. Dr. Murphy made a good point in saying that peanut candy is a common cause of this condition. Children without molars are given peanut candy; of course they cannot chew, but they are given the candy and in a great many instances this has been the source of the peanut kernel in the bronchi. His impression as to the small size of the fragments corresponds to my own. I have been impressed in a number of cases with the relatively small size of the peanut kernel; but the subsequent recovery proves that the relatively small piece of kernel was the cause of the illness. Dr. Mosher's remarks are important contributions to the subject. Tracheotomy was mentioned in connection with cases where we had to save the child from asphyxia. It was not for the purpose of inserting the bronchoscope, but to give the child air and to get out thick secretions and tide the child over until he got in condition for a bronchoscopy. The bronchoscopy was always done through the mouth, not for the sake of the technic, but simply that it is easier to work with the bronchoscope through the mouth in the old way than when it is put through the neck with the head in the way. The tracheotomic route has no advantages. If the bronchoscope is inserted, the patient's head being concealed, no observer can tell by looking through the tube whether it went in through the tracheal wound or through the mouth. Tracheotomy for the insertion of a bronchoscopic is a relic of the developmental stage of bronchoscopy. In regard to using morphin, until I went to Philadelphia I was afraid to use either morphin or cocain in children, and I never used them. But when I arrived in Philadelphia Dr. Graham and Dr. Hare said morphin at least could be given with perfect safety if given with proper precaution. Under their careful guidance I used it in older children with complicated mechanical problems of disentangling foreign bodies and have found it of the utmost value, although I think it must be used with care and discretion in selected cases and in older children only. I am glad of the corroboration in Dr. Turck's remarks, but I must disclaim credit for the hypothesis of the alien protein; that was the suggestion of Dr. Coplin of Jefferson Hospital. Sir St. Clair Thomson is altogether too modest in saying that he understands only English. I heard him give an address at the Congress in London in three different languages succesively and heard him translate into three or four different languages the words of different speakers. So I must say he is the master of many languages instead of one, and he is also a master of the bronchoscope.

GANGRENE FOLLOWING CARBON MONOXID POISONING

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BOSTON

REPORT OF CASE

Sunday morning, December 22, the three O'Connell brothers left Warren Bridge in their motor boat, for a fishing trip in Boston Harbor. The day was beautiful and warm. All the brothers went forward. After passing the narrow gage ferry, Cornelius went into the cabin to lie down.

The cabin was 15 by 7 feet. Before starting on the trip, Cornelius had disconnected the exhaust pipe preparatory to installing another muffler. This exhaust was ordinarily carried out along the bottom of the boat, but the pipe was disconnected within 3 feet of the engine, leaving the open exhaust in the cabin.

Fig. 1.—Condition of hands before operation.

When they approached Apple Island, Timothy asked John to go into the cabin and arouse Cornelius. After fifteen minutes, John had not returned and Timothy noticed through the open door that he had fallen suddenly forward. Timothy shut off the engine, rushed in and found Cornelius lying on the floor about 8 feet from the engine. John was within 4 feet of the engine and was dead.

Cornelius at this time was still breathing. He was carried out of the cabin and efforts were made to revive him. At first, he talked incoherently. The police boat was signaled and they were towed in. When they arrived at the wharf,

John was pronounced dead and Cornelius was taken to an emergency hospital and the following day was transferred to another hospital, where he remained a week.

He was treated for what appeared to be second degree burns of both hands and feet. His record in that institution states that the backs of both hands and feet were covered with large tense blebs. These were punctured and trimmed off, and boric ointment dressings were applied. After leaving the hospital, he was attended by his physician, who continued

Fig. 2.—Superficial gangrene of feet.

treatment, but soon observed that the affected areas were increasing in size and extensive gangrene was developing.

He was admitted into my clinic, Jan. 24, 1919. On admission, his condition was as follows:

Right hand: Gangrene involved the entire three middle fingers, one half of the inner border of the thumb and an extensive area of the little finger. The left hand showed gangrene of the distal phalanges of the four fingers and flexor surfaces of the thumb. Gangrenous areas were on the outer border of the tibial region, the external malleolus, the outer border of the dorsum of the foot, and small patches on three toes. On the left foot, there were gangrenous areas at distal end of two toes.

It was evident from the location and character of the lesions that they could not have been produced from contact with heat. The type of gangrene differed widely from any previously observed by me. At the time the patient entered our hospital, the blebs which resembled burns had entirely passed away. Situated beneath these areas, a dry gangrene was present. This necrosis attacked the skin, muscle tissue, tendon, periosteum and bone, and entered several joints.

Lines of demarcation were well established. On the left hand, the tips of the fingers were entirely necrotic. On the right hand, the ends of the fore and middle fingers were viable, while extensive gangrenous areas involved the dorsum of both these fingers. It is impossible to conceive of a burn producing areas thus distributed.

Examination of the blood and urine were negative. Absence of sugar, which is frequently present in carbon monoxid poisoning, is accounted for by the long interval which had elapsed since the intoxication.

January 28, thirty-seven days after the accident, amputations were performed as follows: On the right hand, the three middle fingers were disarticulated at the metacarpophalangeal joints. On the left hand, four fingers were amputated midway in the second phalanx. As amputations were made in septic areas and as attempts were made to save all tissue possible, the flaps were only partially drawn together and ample drainage was provided.

As will be seen by referring to Figure 1, an area of necrosis remained on the dorsum of the middle finger and the thumb of the right hand. This destructive process continued, entered the second phalangeal joint, and resulted in deformity and ankylosis. Perhaps amputation of the little finger would have been desirable, but this can be done at a later time.

Figure 2 illustrates a more superficial type of necrosis, from which the patient ultimately recovered without the loss of any toes. The necrotic areas on the dorsum and outer aspect of the right foot, after sloughing deeply, finally healed by granulation.

PREVIOUS CASES

In connection with the foregoing, the two similar cases recorded in the literature may be of interest, and brief abstracts are appended. They are reported, respectively, by Alberti[1] and by MacLean.[2]

Alberti reports extensive gangrene of the musculature of the throat and paralysis of the left leg in consequence of carbon monoxid intoxication. This patient, W. Kaupe, was overcome with carbon monoxid escaping from a stove. When he awoke, he saw that the woman lying beside him was dead. Her face was congested and swollen and covered with tabloid vesiculations. He had stabbing pains in the head, and on attempting to rise, he fell unconscious. A paralysis of the right foot and painful swelling of the right elbow appeared, with pain in the arm and stiffness in the neck. On the right side of the neck, there was a brownish black mummified area, the size of the palm of the hand, which remained entirely dry and was surrounded by a line of demarcation. It was necessary to incise to the depth of 2 cm. before blood, mixed with dark brown fluid, appeared. The gangrenous area on the neck and right elbow extended, and he died twenty-six days after the intoxication.

The case of MacLean showed carbon monoxid poisoning resulting in gangrene of both legs. The patient was found unconscious in his room with a small gas burner open, in which the flame had been accidentally extinguished. The gas contained 7 per cent. carbon monoxid. A week later, the patient complained of pain in the feet and legs and was readmitted to the hospital because both feet and legs were swollen and discolored in patches, the discoloration extending below the knees. During the next two weeks, the pain continued, the legs became edematous, and discoloration increased to gangrene. The right leg was amputated, January 9, and the left, January 13. Recovery followed.

Fig. 3.—Hands after amputation.

1. Alberti: Deutsch. Ztschr. f. Chir. **20**: 476, 1884.
2. MacLean, Angus: Carbon Monoxid Poisoning Resulting in Gangrene of Both Legs, J. A. M. A. **56**: 1455 (May 20) 1911.

THE SURGICAL TREATMENT OF TYPHOID CARRIERS *

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In this article we record the results of surgical treatment of six chronic typhoid carriers; one (a "urinary" carrier) was cured by nephrectomy, three ("intestinal" carriers) were cured by cholecystectomy, and two ("intestinal" carriers) failed of cure by cholecystectomy. The diagnoses and conclusions in the "intestinal" carriers have been based entirely on the outcome of cultures of the duodenal contents rather than on the outcome of cultures of the lower intestinal contents. Negative duodenal cultures are also recorded in a seventh carrier who had a cholecystectomy in 1913.[1] These results, while not perfect, are believed to be better than can be shown for any other kind of treatment available at present and are certainly better than the results of no treatment at all.

The literature of the treatment of typhoid carriers contains the record of a number of apparent cures following cholecystectomy[2] and the use of the roentgen ray,[3] vaccines,[4] lactic acid bacilli,[3] and various drugs.[3] These conclusions, however, are based almost altogether on the results of cultures of the feces. In view of our present knowledge of the pathology of typhoid carriers and of the differences between cultures of the bile and those of the feces, these apparent cures are open to some question. On the other hand, a number of failures have been reported even with only feces cultures as a standard of cure. These cases are, of course, of definite negative value. Failures following cholecystectomy[5] will be referred to later. In general, it may be said that the future literature will be much more valuable than the past literature if workers will confine their reports to cases which have been examined by aid of the ureteral catheter and duodenal tube.

Fig. 1 (Case 1).—Left kidney; typhoid pyonephrosis; typhoid fever, 1912; left nephrectomy, May 28, 1918; cure.

* From the Laboratory Service, Walter Reed General Hospital.

* Read before the American Society of Tropical Medicine, Atlantic City, N. J., June 16, 1919.

1. Leary, T. J.: Surgical Method of Clearing Up Chronic Typhoid Carriers, J. A. M. A. **60**: 1293 (April 26) 1913.
2. Fromme, A.: Deutsch. Ztschr. f. Chir. **107**: 578, 1910.
3. Cummins, S. L.; Fawcus, H. G., and Kennedy, J. C., J. R. A. M. C. **14**: 351, 1910.
4. Meader, F. M.: New York State J. M. **12**: 355, 1912.
5. Locle, W.: Deutsch. med. Wchnschr. **35**: 1429, 1909. Fromme (Footnote 2).

CONTROL OF COMMUNICABLE DISEASES

Shortly after the declaration of war, the Surgeon-General's Office prepared directions for sanitation and for the control of communicable diseases in the Army which were issued by the War Department as Special Regulations No. 28.[6] Paragraph 28, *b* and *c*, is as follows:

(*b*) No man should be employed as cook or handler of food or water who is a carrier of *B. typhosus, B. paratyphosus* A or B, or cysts of *Endameba histolytica.*

(*c*) Stools of all cooks and food handlers (including handlers of water and drivers of water and ice wagons) will be examined for typhoid, paratyphoid A and B, and dysentery bacilli, and for cysts of *Endameba histolytica.* In case of enlisted men, notation of positive findings should be made on the service record.

As a result of these regulations, a large number of men were examined and a small number of typhoid carriers were found. Exact percentages of the carrier rate cannot be given, as not all carriers were reported and all the examinations were not satisfactory; but the number of men examined in the first six months was about 30,000. Routine examinations were also made of convalescent typhoid patients, and two carriers in this series were found in this way who were carrying typhoid bacilli five and six months after recovery from their fever. No paratyphoid carriers have come under observation to date. The disposition of these men was naturally more of a problem than the diagnosis. They were automatically relieved from duty as food handlers, and some were at first discharged from the service locally. On account of the unusual opportunity afforded to study the carrier problem, it was decided by Col. F. F. Russell, in charge of the division of infectious diseases of the Surgeon-General's Office, to collect as far as possible all carriers at the Walter Reed General Hospital, Washington, D. C., for observation and treatment. Surgical treatment was considered the most promising in view of the pathology of the carrier state as seen experimentally in rabbits and on account of an earlier successful cholecystectomy, as well as of the results of various kinds of treatment recorded in the literature on this subject. Some of these men consented willingly to operation when the condition was explained. Others at first refused; but when it was made clear to them that during the war they were subject to court martial if they refused an operation that might fit them for duty, they also agreed to operation.

REPORT OF CASES

Case 1 (record furnished by Major A. Kemble, Washington, D. C., in charge of case).—*History.*—C. W. R., cook, 14th Balloon Company, aged 21, white, in service four months,

6. Special Regulations No. 28, W. D., 1917, 22.

tationed at Omaha. The patient's father died of cancer. The family history was otherwise negative. The patient had had the usual diseases of childhood and typhoid fever in 1912-1913, lasting from October until January. Since May, 1916, he had had eight typhoid inoculations, the last three being in January, 1918. He said he had never had any symptoms referable to the genito-urinary tract. Venereal history was negative.

In the course of routine stool and urine examination of food handlers he was found to be a "urinary typhoid" carrier by Major Davis at Central Department Laboratory, Col. C. F. Craig in charge, March 20, 1918. April 13, he was admitted to Walter Reed General Hospital for observation and treatment.

He was a well proportioned man weighing 175 pounds and in generally good physical condition. The temperature was normal. There were no unusual symptoms or physical signs present. A specimen of bile obtained through a duodenal tube was negative for typhoid bacilli. The left kidney was palpable but only slightly enlarged. The urine was turbid in appearance and acid. The specific gravity was 1.014, and contained a heavy trace of albumin and numerous pus cells. Cultures showed a pure, rich culture of typhoid bacilli. The patient was transferred to the genito-urinary service. May 3, cystoscopy revealed a much congested bladder. Both ureteral orifices were normal and the bladder was otherwise negative. The prostatic orifice was normal and no residual urine was present. The ureters were easily catheterized. The flow from the left was very free and continuous, and two large test tubes of cloudy fluid were obtained. A normal flow and a normal fluid were obtained from the right. On these specimens the laboratory reported the following:

From left kidney: Cloudy with leukocytes, epithelial cells and threads of bacilli. Urea concentration: 0.005 in 1 c.c. The specimen contained a rich pure culture of *B. typhosus*. From right kidney: clear; calcium oxalate crystals. Urea concentration: 0.031 in 1 c.c. Culture: A few colonies of *B. typhosus* (probably from bladder). A thorium pyelogram revealed a large hydronephrosis of the left kidney. May 15, the function (phenolsulphonephthalein) on each kidney was: left, less than 1 per cent.; right, 22.5 per cent.

Fig. 2 (Case 4).—Typhoid gallbladder: typhoid fever, August, 1911; cholecystectomy, Nov. 12, 1918; cure.

Operation and Result.—May 28, a left nephrectomy was performed by Capt. D. Borden and Captain Kemble. The pathologic report on the kidney and on the gallbladders in this series has been made by Capt. M. W. Lyon, Jr.:

"C. W. 15 s W. R. G. H. Kidney, 0.130 by 70 mm., weight 212 gm. It shows marked grade of hydronephrosis. The pelvis and calices are enormously dilated, the kidney being reduced to a shell varying from 2 to 5 mm. in thickness. Microscopic examination of one of the thin parts of the kidney shell shows an absence of kidney structure, the outer portion being a wall of new fibrous tissue and the inner a mass of infiltrating small round mononuclear cells". (Fig. 1).

The contents of the pelvis consisted of a thin turbid fluid containing leukocytes and a pure culture of typhoid bacilli. The wound was drained and the patient made an uninterrupted recovery. Cultures of the urine after operation for *B. typhosus* were as follows: May 20, +; June 1, +; June 3, —; June 10, —; June 30, —. Since June 30, the urine has been constantly negative. A small fistula was present for five weeks after operation. A culture from this was negative for typhoid bacilli. July 6, cystoscopy revealed a bladder mucous membrane somewhat grayish in appearance and a mild degree of trabeculation; otherwise normal. August 29, the bladder was normal.

The patient went to limited service duty in good condition. This is a remarkable case of a typhoid carrier of six years' standing whose left kidney had become practically functionless but who had never had any symptoms. He was a cook and his urine was as rich in typhoid bacilli as a broth culture. Fortunately such cases are comparatively rare, but a somewhat similar case was recently reported by Ruediger.[7]

Case 2.—A. V. McD., private, Unassn. Tr. Det., Camp Lee, Va., aged 27 (home, Lynchburg, Va.), was admitted in June, 1918, with typhoid fever. Typhoid vaccinations were given: one dose, June 3, 1918, and (patient's statement) three doses in 1917 before entering the army. Diagnosis of "typhoid carrier" was made by the laboratory at Walter Reed General Hospital from cultures of duodenal contents, Aug. 27, 1918. The urine was negative.

Nov. 19, 1918, the gallbladder was removed by Major J. A. Hill. "McD., A. V. 98 s W. R. G. H.; gallbladder; rather small and contracted, measures about 60 by 20 mm. The vessels are rather conspicuously dilated. The mucosa is dull reddish brown in color and under the surface the vessels are rather prominent. No stones are present." Contents of bladder showed a pure culture of typhoid bacilli.

Recovery was prompt and the patient is now in good physical condition. He was discharged as cured after two successive negative cultures of duodenal contents, March 4, 1919.

Case 3.—W. O. L., private, 11th Cavalry, Fort Myer, Va., aged 22, was admitted, July, 1918, with typhoid fever. Typhoid vaccination was given, June, 1917. The patient was diagnosed as an intestinal carrier by Captain Spruit at the Embarkation Laboratory, Newport News, during convalescence. He was sent to duty by mistake, but was traced and sent to Walter Reed General Hospital, Jan. 31, 1919. Diagnosis of carrier was confirmed by duodenal culture.

Cholecystectomy was performed, Feb. 26, 1919, by Major E. M. Jones. "L., W. O. 164 s W. R. G. H., gallbladder, 70 by 30 mm. Its walls appear slightly thickened, but in general the organ appears essentially normal. The mucosa shows a few hyperemic spots and varies in color from a dull pinkish gray to much larger areas stained greenish brown by bile. A subspherical stone almost black in color is present, about 8 mm. in diameter. It is roughened, resembling a mulberry."

TABLE 1.—RESULTS OF EXAMINATION FOR TYPHOID BACILLI, CASE 2*

	Aug.			Sept.			Oct.	Nov.	Dec.	Jan.						Feb.	
	25	27	29	12	19	30	14	19	4	20	22	23	28	27	30	31	10	21
Urine	—	..	..	..	..	..	..	..	..	—	..	..	..	..	..	..	..	..
Feces	—	—	..	..	..	..	..	..	..	—	—	..	—	—	..	..	..	..
Bile	+	..	+	+	+	+	+	(+)	+	..	..	—	—	..	+	..	—	—

* The plus sign (+) refers to result of bile from gallbladder at operation.

7. Ruediger, E. H.: Bacillus Typhosus Associated with Pyonephrosis, J. A. M. A. **70**: 367 (Feb. 9) 1918.

The contents of the bladder showed a pure culture of typhoid bacilli. Recovery was prompt and the patient was sent to duty in good physical condition after three negative cultures of duodenal contents.

Case 4.—M. L. W., Army Nurse Corps, Camp Green, N. C., aged 45 (home, Baltimore), had had typhoid fever in August, 1911. Triple typhoid vaccinations were given in February, 1918. Diagnosis of typhoid carrier was made from cultures of feces at Camp Green, N. C., Aug. 29, 1918. The patient was admitted to Walter Reed General Hospital, Oct. 18, 1918. The diagnosis was confirmed by cultures of duodenal contents. Nov. 12, 1918, the gallbladder was removed by Major J. A. Hill.

"W., M. 95 s W. R. G. H., gallbladder, 60 by 30 mm. The walls are of normal thickness. The large blood vessels in it are conspicuously dilated. The mucosa is hyperemic and light in color but otherwise appears normal. It contains a large, ellipsoidal, blackish brown stone, about 12 by 7 by 7 mm. In the wall of the bladder is an ill-defined impression apparently caused by pressure of the stone" (Fig. 2).

The contents were golden brown and were positive for typhoid bacilli. Recovery was prompt and patient is now in good physical condition, and is on duty again without restrictions.

Case 5.—J. L., cook, 106th Field Artillery, Camp Wadsworth, S. C., aged 39 (home, Niagara Falls, N. Y.), had had typhoid fever in 1911. Nine typhoid vaccinations were given in the three previous years. Diagnosis of typhoid carrier was made at the Army Medical School from cultures of feces made in routine examination of food handlers, Dec. 25, 1917. The patient was admitted to Walter Reed General Hospital, Jan. 9, 1918. Diagnosis was confirmed by examination of duodenal contents, Jan. 15, 1918. Medical treatment with sodium bicarbonate and other drugs was unsuccessful. July 29, the patient's gallbladder was removed by Major F. J. Cotton.

"L., J. 42 s W. R. G. H., gallbladder. The gallbladder is much torn. The open organ measures about 50 by 35 mm. It shows marked engorgement of vessels and the mucosa is pinkish to dark reddish in color. The organ appears small and the fundus contains five well marked stones of very irregular shape and ranging in size from about 10 to about 5 or 6 mm. in the largest diameter. About ten or twelve much smaller stones are present, also of irregular shape. The stones appear to be fragments of a larger stone and vary in color from a dull grayish to a pinkish and dark brownish. The stones appear to be confined to the fundic portion and have left well marked erosions on the mucosa. Around the neck of the bladder the mucosa appears more normal though it is congested." A pure culture of typhoid bacilli was recovered from the contents of the bladder.

This case was a surgical success but a bacteriologic failure, as thirteen successive duodenal contents cultures in eight months were positive. The patient was finally discharged with consent of the board of health of the state to which he went.

Case 6.—E. P., private, 327th Infantry, Camp Gordon, Ga., aged 26 (home, Newberryport, Mass.), had had typhoid fever in 1900. Typhoid vaccination course was completed, Oct. 21, 1917. Diagnosis of typhoid carrier made by department laboratory, Southeastern Department, from cultures of feces made in routine examinations of food handlers, Jan. 8, 1918. The patient was admitted to Walter Reed General Hospital, March 28, 1918. Diagnosis was confirmed by examination of duodenal contents, April 22, 1918. Medical treatment with hexamethylenamin and vaccines had been unsuccessful and, April 26, 1918, the gallbladder was removed.

"E. P., 1 s W. R. G. H., gallbladder. It appears rather small, measuring about 50 by 30 mm. It appears slightly thickened, the mucosa is rather bright reddish and the outside of the bladder shows considerable congestion. It contains a single spheroidal stone, about 10 by 7 mm. varying in color from light to dark brownish. On removal of the stone a distinct impression is left in the mucosa and submucosa."

The contents which were colorless contained a pure culture of typhoid bacilli. The bladder ruptured during removal and the operative area was infected and convalescence was somewhat slow, but the patient entirely recovered and is now in good physical condition. However, his duodenal contents are still positive for typhoid bacilli, indicating that there is a focus probably in the bile passages of the liver. He has finally been discharged from the service with the consent of the board of health of the state to which he went.

Case 7.—(1) M. M., private, first class, 2d Batt. Engrs., aged 38, had had typhoid fever, probably in September, 1910, in the Philippine Islands, "gastro-enteritis with fever." Diagnosis as typhoid carrier was made at Letterman General Hospital, San Francisco, from cultures of feces, Nov. 20, 1910. He was admitted to the Walter Reed General Hospital, April 10, 1911.

Diagnosis of typhoid carrier was confirmed at this hospital in April, 1911. The patient was given medical treatments with calomel, buttermilk, sodium sulphite, hexamethylenamin

TABLE 2.—RESULTS OF EXAMINATION FOR TYPHOID BACILLI, CASE 3

	February				March		April						
	3	6	9	15	26	22	26	2	8	14	17	21	22	28
Urine	..	..	—	..	..	..	..	..	..	—	..	—	..	..
Feces	..	—	—	..	..	—	—	—	..	..	—	—	—	—
Bile	+	..	..	+	(+)	..	+	..	+	..	—	..	—	—

TABLE 3.—RESULTS OF EXAMINATION FOR TYPHOID BACILLI, CASE 4

	October			Nov.		Dec.	Jan.		March
	20	26	30	12	26	3	23	27	31
Urine	—	—	..	..	..	..	..	..	..
Feces	+	+	..	..	—	..	—	..	..
Bile	..	..	+	(+)	..	—	..	—	—

TABLE 4.—RESULTS OF EXAMINATIONS FOR TYPHOID BACILLI, CASE 5

	Jan., 1918				Feb.	Mch.	April	July	
	14	16	19	31	15	2	20	22	29
Urine	..	—	—	—	..	—	—	—	..
Feces	—	+	..	+	..	+	+	+	..
Bile	..	..	..	..	+	..	..	..	(+)

	August									
	3	5	8	9	10	11	16	19	21	23	26
Urine	—	..	..	..	..	..	..	..	..	..	..
Feces	—	—	—	—	—	—	—	—	..	+	—
Bile	..	..	..	..	..	..	..	..	+	..	..

	Sept.	Oct.		Nov.		Dec.	Jan., 1919		Feb.		
	1	2	14	7	24	15	5	9	5	12	20	26
Urine	..	..	..	..	..	..	..	..	..	..	..	..
Feces	..	..	..	..	..	..	..	—	+	+	+	—
Bile	+	+	+	+	+	+	..	..	..	..	..	..

	March			April					
	7	15	25	1	2	3	14	17	21
Urine	..	..	..	—	..	..	—	..	—
Feces	—	..	..	..	..	+	..	..	—
Bile	..	+	+	..	+	..	..	+	+

TABLE 5.—RESULTS OF EXAMINATION FOR TYPHOID BACILLI, CASE 6

	Mch., '18	April			May				
	30	16	22	26	15	19	25	27	29	30
Urine	—	—	..	..	..	..	..	..	..	..
Feces	—	—	+	..	+	—	—	+	—	—
Bile	..	..	+	(+)	..	..	..	..	..	..

	June						July				
	2	4	5	8	9	13	15	19	20	22	26	30	31
Urine	..	..	..	..	..	..	..	..	..	..	..	..	..
Feces	—	—	—	—	—	+	—	—	—	..	..	—	—
Bile	..	..	..	..	..	..	..	..	..	..	+	..	..

	August								Oct.	Nov.	December				
	2	5	6	9	15	17	19	24	1	16	22	14	23	24	30
Urine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Feces	—	—	—	—	—	—	..	—	..	..	..	..	—	..	..
Bile	..	..	..	..	..	..	+	..	—	+	+	+	..	+	+

	February			March		April				
	5	12	17	12	16	2	5	14	17	21
Urine	..	..	..	..	..	..	..	—	..	—
Feces	+	+	+	—	..	—	..	—	..	+
Bile	..	..	..	..	+	..	+	..	—	..

and salol, ipecac and vaccines (stock and autogenous) for four months; all of which proved to be unsuccessful. Jan. 21, 1913, cholecystectomy was performed by Lieutenant Leary and the gallbladder was found to be enlarged and to contain a stone. Culture of the contents showed a pure culture of typhoid bacilli. Recovery was prompt and the patient was discharged, May 19, 1913, as cured.

The patient was examined in January, 1916, by Nichols in El Paso, Texas. His physical condition was good and all cultures, including those of the duodenal contents, were negative.

TABLE 6.—RESULTS OF EXAMINATION FOR TYPHOID BACILLI, CASE 7

	January, 1913							February				Jan., May,	
	20	21	24	25	27	29	31	3	5	7	8	1916	1919
Urine	—	—	..	..	..	..	..	—	—	—	—	—	—
Feces	+	+	—	+	+	—	—	—	—	—	—	—	—
Bile	..	(+)	..	..	..	..	..	..	..	..	..	—	—

The patient was reexamined, May 7, 1919, at this hospital. His physical condition was good and cultures of feces, urine and duodenal contents were negative.

COMMENT

The picture presented by sections of the gallbladder walls can be considered in one place, as it varied only in degree. The essential lesion is an infiltration of the submucosa with leukocytes of the mononuclear type and a few eosinophils. The epithelium is intact and no abscesses are seen in the muscular or fibrous coats. In the carriers of short duration the cells are confined to the submucosa; in the older cases a few cells are seen in the muscularis and fibrous coat, while the submucosa shows a chronic thickening.

In other words, the histologic evidence supports the conception that the cholecystitis occurs through infection of the bile, rather than of the blood.[8] The same picture has been seen in an instance of cholecystitis occurring during typhoid fever, which probably represents the start of the carrier condition.

The standard of cure in these cases has been three successive negative cultures of duodenal contents, and is believed to be reliable provided good specimens are obtained from the patient and provided they are properly handled in the laboratory. The specimen should be neutral or slightly alkaline in reaction to litmus paper, and should show a golden yellow color and syrupy consistency characteristic of bile. The specimen should be cultivated directly, and also should be incubated for twenty-four hours and recultivated before a final report is made. Under these conditions we believe that a culture of duodenal contents is synonymous with culture of the bile. The point has been made that typhoid bacilli might reach the duodenum from the pancreas or from an infected diverticulum of the duodenum itself. There is no record in the literature of any lesion of the pancreas, and experimentally it has been found impossible to make typhoid bacilli pass through a gland which resembles the pancreas, namely, the salivary gland. On the other hand, there is ample experimental evidence[8] that typhoid bacilli pass readily from the blood into the bile and in some cases establish themselves in the bile passages, especially in the gallbladder. We believe that culture of the good specimen obtained through the duodenal tube is equivalent to a culture of the bile and that this culture is the best evidence we can get on what is going on in the bile passages. Such cultures are of course much superior, from this point of view, to cultures of the feces,[9] as may be seen from the failures reported above. Case 6 had eight successive negative feces cultures in one month, followed by a positive duodenal culture; and in several cases a negative feces culture and a positive bile culture occurred in the same day. We are of the opinion that in bile passage carriers the bacilli are regularly excreted in the bile and that the term "intermittent" carrier should be dropped.

TABLE 7.—SUMMARY OF CASES

No.	Initial	Organization	Age	Typhoid Fever	Symptoms	Operation	Date	Interval	Condition Found	Result and Remarks
1	C. W. R.	Cook, 16 Bal. Co.	21	Oct., 1912	None	Nephrectomy	May 28, 1918	6 years	Marked pyonephrosis	Cure; cystitis resolved
2	A. V. Mc.	Pvt. Tr. Det.	27	June, 1918	None	Cholecystectomy	Nov. 19, 1918	5 months	Cholecystitis	Cure
3	W. O. L.	Pvt. 11 Cav.	22	July, 1918	None	Cholecystectomy	Feb. 26, 1919	7 months	Stone	Cure
4	M. L. W.	Army Nurse Corps	45	Aug., 1911	None	Cholecystectomy	Nov. 12, 1918	7 years	Dilated, stone	Cure
5	J. L.	Cook, 106 F. A.	29	1911	None	Cholecystectomy	July 29, 1918	7 years	Cholecystitis with stone	Failure; cultures of duodenal contents still regularly positive
6	M. P.	Cook, 327 Inf.	26	1900	None	Cholecystectomy	Apr. 26, 1918	18 years	Cholecystitis with stone	Failure; cultures of duodenal contents still regularly positive
7	M. M.	Pvt. 1 cl. 2d Eng.	38	1910	None	Cholecystectomy	Jan. 21, 1913	3 years	Cholecystitis with stone	Cure; duodenal contents negative in 1916 and 1919

The principle underlying the surgical treatment of typhoid carriers is the excision of the focus of infection. The same principle applies to the now well established surgical treatment of diphtheria, streptococcus and meningococcus carriers by tonsillectomy. The foci of infection in chronic typhoid carriers are in the two chief excreting organs, the kidneys and the liver; or more specifically in their ducts: (1) the hilum of the kidney; (2) the biliary passages, especially the gallbladder. Pure "intestinal" carriers are not believed to occur any more than pure "urinary" carriers.

1. From an infected hilum, typhoid bacilli are fed into the urinary tract and appear in the urine. They may produce a secondary uretritis and cystitis; if only one kidney is involved and this is removed, the secondary inflammation disappears and the patient is cured.

2. From the bile passages, typhoid bacilli are fed into the intestine and appear in the intestinal contents only so long as the focus is present. There are three possibilities in regard to infection of the bile passages. (*a*) The gallbladder alone may be infected. In this case cholecystectomy results in cure. (*b*) The gall-

8. Nichols, H. J.: Gall-Bladder Infections, J. Exp. M. **24**: 497 (Nov.) 1916.

9. Nichols, H. J.: Alkaline Treatment of Early Gallbladder Carriers, J. A. M. A. **68**: 958 (March 31) 1917.

bladder and bile ducts in the liver may both be infected. In this case cholecystectomy does not cure the carrier condition. Cultures of duodenal contents are still positive. We have no way of determining in which of these two classes a given case falls except actual trial, but it is known that gallbladder carriers are more common than bile duct carriers. There is a third possibility (*c*), namely, the gallbladder might be normal and the bile passages alone might be infected. In this case also cholecystectomy would not be curative; but, from the evidence at hand, such cases must be very rare, if indeed they occur at all.

We are not competent to discuss the strictly surgical aspects of these cases, but are, of course, interested in the outcome from an operative as well as from a bacteriologic point of view. In operations such as these, which are done more for the good of the group than of the individual, it is necessary to insist on excellent surgical technic and judgment, in order to avoid a fateful tragedy such as that which befell a medical officer who had been taking care of meningitis cases and who expected to go home on leave to visit his wife and baby. Although his throat cultures were negative for meningococci, in order to be doubly sure that he was not a carrier he had his tonsils removed and died of hemorrhage.

In the cases mentioned, the operative results were good, although in one case there was what is called a stormy convalescence. The gallbladder was removed from below in some cases and from above in others. The cystic duct was found normal in all. It is obvious that these cases should be worked out with full cooperation between the pathologist and the surgeon. Whether a new specialty of "carrier surgery" should be established to handle this growing field need not be discussed here, but there should be a full understanding about the situation. The laboratory man has taken the initiative in this field and has asked for assistance from the surgeon. The surgeon should be in sympathy with and familiar with the problem. Most surgeons do not refuse an indicated operation, but apparently some surgeons do not agree that a person should be operated on for the good of the group in the absence of personal symptoms. Such surgeons can hardly be expected to do good carrier surgery. But, even with the personal point of view uppermost, these operations come under personal prophylactic surgery, as the organs are always chronically inflamed and the gallbladders usually contain stones.

In cholera the pathology of carriers is apparently identical with that in typhoid carriers, with the exception that there is some question as to the mechanism of gallbladder infection, whether it is through the portal circulation and bile or whether it is an ascending or lymphatic infection. The same principles in surgical treatment should hold in case of cholera, and the surgical treatment of carriers can be expected to be of even more value than in typhoid, as the disease has a more definite seasonal occurrence. In dysentery the evidence is not sufficient to warrant definite statements, but by analogy the same situation may also obtain.

SUMMARY AND CONCLUSIONS

1. So-called "urinary" typhoid carriers are really kidney carriers and can be cured by nephrectomy. An additional argument for operation is present if the infected kidney is functionless. One such case is recorded.

2. "Intestinal" carriers are really bile passage carriers of two kinds:

(*a*) Cases in which the gallbladder alone is infected. These can be cured by cholecystectomy. Four such cases are recorded.

(*b*) Cases in which the gallbladder and bile passages are both infected. In these cases cholecystetcomy does not cure the carrier condition and the condition is incurable at present. Two such cases are recorded.

3. The surgical treatment of typhoid carriers, while not perfect, is the best available.

MUSTARD GAS*

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One of the best known of all the war gases[1] and perhaps the most interesting is the so-called "mustard gas" or dichlorethylsulphid. This gas was first used by the Germans in July, 1917, and received its name from its smell, which resembles the odor of garlic or mustard. It is not a gas at all, but a high boiling, oily liquid, which vaporizes slowly in the air. It is a very poisonous substance and exerts a local action on the respiratory tract, eyes and skin, and a general systemic action when absorbed in sufficient concentration into the blood stream. In the concentrations of this "gas" which are present in the field, probably very little systemic action is generally noticed. The systemic action of the substance is of importance, however, as it leads us to a better understanding of the mechanism of action of the poison, and hence to an intelligent pursuit for a rational method of treatment.

DIFFICULTY OF DETERMINING TOXICITY

One of the first points which must be carefully determined in investigating a substance of this kind is its toxicity. It is important that this be determined very carefully for numerous reasons: (1) to learn what concentrations are dangerous in the field; (2) to ascertain how effective protective devices have to be to remove the "gas," and (3) to furnish a basis for accurate experimental work on treatment. This necessitates the determination of the toxicity of the substance in the form of vapor, and not by the ordinary method of administration by mouth, subcutaneously or intravenously. The simplest method of determining its toxicity in the form of vapor would appear to be to place animals in a gas-tight box and introduce a known amount of the substance in the form of vapor. But difficulties arise. The concentration is not accurately known unless chemical analyses of the air are made, and then it is found to be much less than that calculated from the amount of substance introduced, mainly because of condensation on the walls of the chamber, of absorption of the substance by the skin and the hair of the animals and, probably, in some cases, of decomposition of the substance by moisture in the air. Moreover, it is found that the concentration decreases markedly with time. Because

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* The experimental investigations on which this paper is based were conducted by the Pharmacological Research Section, Medical Division, Chemical Warfare Service, at the American University Experiment Station, Washington, D. C.

1. For description of gases used by the Germans, see Auld: J. Washington Acad. Sc. 8: 45, 1918.

of these factors, the figure used for the concentration is more or less guesswork. To overcome these difficulties, a chamber is used through which a continuous current of air, containing a known and constant amount of the poisonous vapor, is passed. In fact, the air in the chamber is changed once or twice a minute.[2]

Another point of difficulty is the great individual variation in the susceptibility of animals. This is probably greater than when the poison is administered subcutaneously or intravenously. It necessitates the use of a large number of animals in making a determination of the toxicity of a gas. Again, the toxicity for different species may vary, and as our ultimate aim is a knowledge of the toxicity for man, a great many different species must be used. If the toxicity is widely different for different animal species, it is hard to arrive at a conclusion as to the toxicity on man. In the case of mustard gas, determinations on dogs, rabbits, guinea-pigs, rats, mice, goats and monkeys have shown that there is no wide species variation as with some other gases. Hence, the figures obtained on animals will probably apply to man.

EXTREME TOXIC EFFECT

Without giving detailed figures, it may be said that this gas is an extremely toxic one. Five-tenths mg. per liter of air (or one part in 14,000) will kill an animal on an exposure of less than five minutes, while less than 0.01 mg. per liter (or about one part in 1,000,000) will prove fatal on eight hours' exposure. Death will not be immediate, of course, but will take place some days later. Concentrations smaller than the lethal ones will produce toxic effects.

For instance 0.0005 mg. per liter (or about one part in 14,000,000) will cause conjunctivitis on a prolonged exposure, and may incapacitate a man. About 0.002 mg. per liter (or about one part in 3,000,000) will cause a skin burn in a sensitive person on prolonged exposure. The reason why mustard gas has proved to be more an incapacitating gas than a lethal gas, under warfare conditions, is undoubtedly its very low vapor pressure. Very low concentrations are obtained in the field with this substance for any length of time.

SYMPTOMS AND SYSTEMIC EFFECTS

The symptoms which arise from exposure to mustard gas are now too well known to need detailed description.[3] They consist essentially of local irritation of the upper respiratory tract, eyes and skin, giving rise to conjunctivitis and superficial necrosis of the cornea, hyperemia, edema, vesication, and later necrosis of the skin, leading to a skin lesion of great chronicity, and congestion and necrosis of the epithelial lining of the pharynx, trachea and bronchi. In animals exposed to high concentrations of this gas, vomiting and diarrhea, hyperexcitability and convulsions, and effects on the heart suggest an absorption into the blood stream and a systemic action.

Experiments demonstrate clearly that there is an absorption through the lungs of dichlorethylsulphid. When this substance is injected either subcutaneously or intravenously into a dog, the following symptoms make their appearance after a latent period: salivation; hyperexcitability and convulsions; vomiting and bloody diarrhea; a slow and irregular heart, which becomes rapid before death; muscular weakness, and finally, coma and death. Necropsy reveals a more or less intense congestion of the intestinal mucosa, which is frequently accompanied by hemorrhage into the lumen of the intestine. These effects on the heart, the gastro-intestinal tract and the central nervous system can practically all be observed in dogs poisoned by inhalation of high concentrations of mustard gas. This leaves little room for doubt that in high concentrations this gas is absorbed through the lungs and produces systemic effects in the body. Further proof of the absorption through the lungs is furnished by the detection of one of the decomposition products of mustard gas in the urine of gassed animals. On contact with water, mustard gas hydrolyzes very readily and gives rise to hydrochloric acid and dihydroxyethylsulphid:[4]

$$\begin{matrix} ClCH_2CH_2 \\ ClCH_2CH_2 \end{matrix}\!\!>S + 2H_2O = \begin{matrix} OH.CH_2CH \\ OH.CH_2CH_2 \end{matrix}\!\!>S + 2HCl$$

Dihydroxyethylsulphid was injected into a dog, and the urine was collected and examined for this substance. A positive test was obtained. This proves that the substance is excreted, in part at least, unchanged. The injection of dichlorethylsulphid was next tried and the urine found to contain the dihydroxyethylsulphid. The latter substance was then detected in the urine of animals which had been poisoned by inhalation of mustard gas.

MECHANISM OF ACTION

The latent period in the development of the effects of mustard gas either when inhaled or injected, suggests that the substance may be altered chemically in the body before exhibiting its characteristic effects. The simplest chemical change which the substance undergoes in the test tube is a hydrolysis into hydrochloric acid and dihydroxyethylsulphid. That this change also takes place, in part at least, in the animal organism is evidenced by the excretion of dihydroxyethylsulphid in the urine. The injection, however, of a completely hydrolyzed solution of mustard gas is followed by absolutely no symptoms. The dihydroxyethylsulphid has no irritating effect on the skin and is comparatively a nontoxic substance when injected intravenously. This decomposition product is, therefore, not responsible for the effects of mustard gas. Hydrochloric acid, the other product of hydrolysis, is not a very toxic substance. It can be injected in small doses without very much effect. The buffer system of the blood immediately neutralizes the acid, and the tissues are really never exposed to it. When the body is flooded with large doses of acid, however, death results. An acid reaction is incompatible with life. Both products of hydrolysis of mustard gas are readily soluble in water and sparingly soluble in organic solvents, while mustard gas is very sparingly soluble in water and freely soluble in organic solvents. The hydrolytic products have a low lipoid solubility and would not be expected to penetrate cells easily, while mustard gas has a high lipoid solubility and would probably penetrate cells readily.[5] Its effects on the skin prove its power of penetration. Having penetrated into the cell, it would undoubtedly hydrolyze in

2. Marshall and Kolls: J. Pharmacol. & Exper. Therap. **12**: 385 (March) 1919.

3. Lynch, Smith and Marshall: J. Pharmacol. & Exper. Therap. **12**: 291 (Dec.) 1918. Warthin et al.: J. Lab. & Clin. M. **3**: 447 (May) 1918; **4**: 785 (Oct.) 1918; **4**: 833 (Oct.) 1918; **4**: 229 (Feb.) 1919; **4**: 265 (Feb.) 1919.

4. Hopkins: J. Pharmacol. & Exper. Therap. **12**: 393, 1919.

5. Harvey: Publication 212, Carnegie Inst. of Washington, 1915, p. 143.

the aqueous phase of the cell. The liberation of free hydrochloric acid within the cell would produce serious results and might explain the effects of dichlorethylsulphid. To summarize, then, the mechanism of the action of dichlorethylsulphid appears to be:

1. Rapid penetration of the substance into the cell by virtue of its high liquid solubility.
2. Hydrolysis by the water within the cell, to form hydrochloric acid and dihydroxyethylsulphid.
3. Destruction by hydrochloric acid of some part or mechanism of the cell.

Accumulated knowledge of various other facts tends to substantiate this theory of the intracellular liberation of hydrochloric acid as the mechanism of the action of mustard gas.[6] The ideal treatment for mustard gas poisoning would be to employ some nontoxic substance which would penetrate the cell and neutralize the effects of the hydrochloric acid. Efforts made in this direction have not been entirely successful.

It is interesting to note that all the war gases contain a halogen and can give rise to hydrochloric or hydrobromic acid on decomposition. One might, therefore, speculate on the possibility of the action of all war gases being due to the liberation of acid. At present, however, this is merely speculation.

In regard to the action of mustard gas on the skin, it is well known that some persons are more readily affected than others. We have been able to devise simple tests for determining the susceptibility of the skin of an individual to mustard gas. Without going into detail as to the methods used, I may summarize certain interesting facts which have been discovered. One man may be 600 times as susceptible to the action of mustard gas as another. Negroes, as a race, are far more resistant than white men. About 2 to 3 per cent. of white men are hypersensitive, while 20 to 40 per cent. are resistant. If a hypersensitive and resistant man are exposed to mustard gas, the former will undoubtedly receive severe skin burns, while the latter may entirely escape them.[7]

6. Lynch, Smith and Marshall: J. Pharmacol. & Exper. Therap. **12**: 265 (Dec.) 1918. Lillie, Clowes and Chambers: Science **48**: 382, 1919.
7. Smith, Clowes and Marshall: J. Pharmacol. & Exper. Therap. **13**: 1, (Jan.) 1919. Marshall, Lynch and Smith (Footnote 3).

Birth Rate of Whites During War Normal.—To ascertain whether the war affected the birth rate of Maryland and Baltimore, because of agitation regarding this subject abroad and elsewhere in the United States, Dr. Frederick V. Beitler, Halethorp, Md., of the bureau of vital statistics, has compiled statistics covering the period from 1915 to July 1, 1919, inclusive, and the conclusions which the study of the figures presented revealed that the birth rate, whatever has happened abroad, has not been affected appreciably in Maryland. On the contrary, births in 1918 and thus far in 1919 have been normal. The only doubt which might exist that they may perhaps make the rate appear a shade less than normal lies in the inability to estimate properly the growth of population in the state during those months of the war period—that is, the growth from outside sources—from migration here from other sections of the country. Just what this has been no one seems to know with any certainty, but that it has not been sufficient to weigh heavily on the side of diminution of birth rate is a generally accepted fact among those who have given the matter serious attention. In 1918 the death rate exceeded the birth rate, a condition which had not been noted before since the health wardens have been tabulating the returns. This was caused by the influenza epidemic and ailments incident thereto and it is reflected in the early returns of 1919, but the present year, unless there is a recurrence of the malady, will about measure up to other years in proportion to the population.

POISONING WITH THE LETHAL WAR GASES*

PHYSIOLOGY AND EXPERIMENTAL TREATMENT*

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The most important members of the group of lethal gases are chlorin, phosgen and chlorpicrin. These substances are alike in that they act on the respiratory tract, producing edema and congestion. Chlorin acts with extreme rapidity. The toxic action of phosgen is slower, probably because, to produce its effects, it must undergo chemical change. This fact has earned for phosgen the name of having a delayed action. Chlorpicrin appears to stand somewhere between chlorin and phosgen, both in regard to the type of influence provoked and in the rate of production of intensive edema.

From an extensive investigation, on dogs and goats, of the acute effects of gassing, it is quite evident that the detrimental influence of these gases is confined to the respiratory tract and that all other effects must be regarded as secondary, since it has been impossible to determine the absorption of these gases into the blood stream. Exposure to them results in a variety of changes in the organism, in addition to the development of pulmonary edema. Thus, gassing has a definite influence on the respiration, heart beat, temperature, concentration of the blood, the water content of the lungs and other tissues, the chlorid content of the blood and tissues (with resulting changes in chlorid excretion by way of the kidney), the number of red and white cells of the blood and the respiratory function of the blood, leading to dyspnea and partial asphyxia. Acidosis is present at times, and there is a distinct influence on protein metabolism.

When one attempts to correlate these various effects, the task at first seems well nigh impossible. Closer inspection, however, brings to light one significant feature, namely, changes in the concentration of the blood. Viewed from this standpoint, the picture presented by a typical lethal gas, namely, phosgen, shows that acute gas poisoning may be divided into three stages.

STAGES IN PHOSGEN POISONING

In the first stage, which lasts from five to eight hours, there is usually a very significant dilution of the blood. In this period, pulmonary edema is developing. In the first part of this period the temperature may fall markedly; in the latter part of the period there is a greatly accelerated pulse, accompanied by a rise in temperature considerably above the normal.

The second stage, which reaches its maximum between the fifth and twenty-fourth hours, is characterized by a very marked concentration of the blood. In this period the temperature may be well maintained, or there may be a distinct drop below normal. If the temperature is well maintained, the condition of the individual is considered good. On the other hand, if the temperature suddenly falls, the outcome is usually fatal.

* Read before the Section on Pathology and Physiology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

The third stage is characterized by a readjustment to normal conditions with respect to both concentration of the blood and temperature.

AN INTERPRETATION OF GAS POISONING

The interpretation which may be placed on the different stages of phosgen poisoning is as follows:

In the first stage there is marked dilution of the blood. There are at least two ways in which this dilution may be explained. In the first place, it may mean an increased blood volume, the excess fluid finding its way into the blood from the tissues in response to the strong irritation stimulus exerted by the gas on the respiratory tract. Or secondly, a diluted blood would result if the red cells were removed in part and deposited in some organ or tissue. In the present investigation no studies have been made to determine actual changes in blood volume. Reports by Eyster and Meek, however, who have made such estimations, tend to the conclusion that in the stage of phosgen poisoning under discussion, blood volume is not increased, and they account for the dilution of the blood on the hypothesis that red cells are stored in the lungs, at least temporarily. Whichever explanation is correct, it is certain that during this first stage two features may be quite prominent, namely, edema of the lungs and dilatation of the heart. Edema can be explained very readily on the hypothesis of increased blood volume, and it is also possible that such a condition might lead to a dilated heart. On the other hand, the deposition of corpuscles in the lungs, by causing an obstruction in the circulation, would lead to a dilated heart. The relatively large transport of fluid to the lungs during this period is, however, not so easily explained by this hypothesis. Whichever hypothesis is accepted, edema of the lungs prevails, and there may be a dilated right heart.

In the second period, edema has reached its maximum development, and here, also, blood concentration is at its height. The latter state is undoubtedly induced by the withdrawal of fluid which finds its way into the lungs. During the interval of blood concentration, the blood volume is definitely decreased, and the heart may be noticeably diminished in size (Eyster). This, presumably, would result in a decreased efficiency of this organ and lead to an inadequate circulation. Later, when the blood resumes its normal degree of concentration, normal heart action is reestablished.

The development of edema induces a mobilization of chlorids in the lungs at the expense of the chlorids of the blood, the lowered chlorid content of which may be explained in part by loss of chlorids through the kidneys, since at this period the output of chlorids in the urine is appreciably augmented. Later, during the second stage, the chlorids of the lungs reach a maximum, the blood content is not called on, and, therefore, an approximately normal blood chlorid content may be found, which is maintained thereafter. This chlorid retention by the lungs coincides with the fact that on the second day of phosgen poisoning the urinary excretion of chlorids is usually below normal. The period of readjustment now follows, during which edema subsides in the lungs, and presumably both fluid and chlorids are demobilized by the lungs and find their way into the blood. The excess of chlorids over the normal in the blood is eliminated through the kidneys. This circumstance would account for the large output on the third day after gassing.

The changes in oxygen capacity, erythrocytes and hemoglobin follow the curve of alterations in blood concentration throughout the entire course of phosgen poisoning, which might well be anticipated. The oxygen content of arterial blood shows, in general, relatively unimportant changes, whereas that of venous blood progressively diminishes throughout the first and second periods of phosgen poisoning. This may be explained in the first period by the fact that the blood is diluted, and, in the second period, is undoubtedly caused by the longer contact of the blood with the tissues, induced by an inefficient circulation.

The respiratory changes are correlated with the impaired respiratory functions of the blood, such as lowered oxygen content and incomplete saturation of the hemoglobin with oxygen.

In the first stage, the decreased heart rate may be explained best perhaps on the hypothesis of nervous inhibition. The later rapid pulse is directly induced by the viscous character of the blood, which causes oxygen want. Although specific data are lacking, it appears quite evident that there is a distinct fall of blood pressure. One may assume a direct relationship between the heart's efficiency and temperature. Thus, in the first part of the first stage, the heart action is slow, there is inefficient circulation, and the temperature falls. Later, the greatly accelerated pulse is accompanied by a rise in temperature far above the normal. From this it would appear possible that the heart has temporarily overcompensated, resulting in an efficiency of the circulation above the normal.

Now follows the stage of concentration of the blood. This concentrated blood is, without doubt, more difficult to circulate through the body, and, if the heart is doing only its normal work, there will be, as a result of the thickened blood, a circulation of less than normal efficiency; and such a condition apparently results in a falling temperature. In case the heart responds with a much higher rate during the period of concentration, so that even with the thickened blood it appears that a circulation of close to normal efficiency is being maintained, it will be found that the temperature is also well maintained.

In the animals which are less seriously affected, and in which only a slight edema of the lungs develops, with a consequent slight loss of fluid from the blood, it will be found that the temperature is well maintained, provided the heart rate is normal. Even in such cases, however, the continuous, even though slight, loss of fluid from the blood will eventually result in a concentration of the blood which will bring the circulation below normal efficiency, even with a high pulse rate; and the temperature will slowly drop until, at about the twenty-fourth hour, it is about 1 degree Centigrade below the normal. On the other hand, in the animals which are seriously affected, the blood concentrates very rapidly. The heart, even though the rate is maintained far above normal, is nevertheless not able, apparently, to maintain a circulation of normal efficiency; the temperature drops very rapidly, and the animal dies within less than twenty-four hours after gassing.

In brief, then, it seems plausible that the temperature is directly related to the efficiency of the circulation, and this in turn is determined, in part at least, by the concentration of the blood and by the pulse rate.

This view seems to be further strengthened by the results obtained from a study of animals gassed with chlorin and chlorpicrin. In both of these cases there is, in general, a state of concentration of the blood beginning immediately after gassing. Only in rare instances does dilution of the blood occur, and then it is only for a short time. From the first, then, in animals poisoned with the last named gases, there obtains a condition in which the blood is above normal in concentration, and, in correspondence with this, the temperature remains below normal; and the more seriously the animal is affected and the greater the concentration of the blood, the greater will be the fall in temperature.

Phosgen poisoning has been considered in detail, since it is unique in showing among its effects the initial stage of dilution of the blood. At times, chlorpicrin presents a similar stage, but the interval is never so pronounced in length, nor the dilution in degree, as obtains in phosgen poisoning. Usually a preliminary dilution period is lacking. It is this period that undoubtedly gives to phosgen the distinction of possessing a so-called "delayed action." Chlorin gas rarely, if ever, causes a period of blood dilution. In general, if one should consider the changes in blood concentration outlined for phosgen, minus the initial dilution period, the remaining curve would represent fairly accurately the alterations occurring in the blood in both chlorin and chlorpicrin poisoning. This would, of course, entail differences in time relationships; but, under the conditions noted, the changes in blood concentration, in cases of chlorin and chlorpicrin poisoning would be accompanied by the same general type of effects which is produced by phosgen. Under these circumstances, it appears superfluous to recite further the correlation of the effects of chlorin and chlorpicrin poisoning.

CAUSE OF DEATH

It is usually assumed that pulmonary edema is the cause of death in gas poisoning. While it is true that pulmonary edema and changes in blood concentration are intimately associated in gas poisoning, the edema being the cause of the concentrated blood, nevertheless, the direct cause of death is the extreme concentration of the blood rather than the presence of fluid in the lungs. Death is caused by something more than simple inability of the blood to absorb oxygen, by something more than a physical obstacle in the lungs. It is quite logical, therefore, to assume that blood concentration is immediately responsible for death. Blood concentration means a failing circulation, an inefficient oxygen carrier, oxygen starvation of the tissues, fall of temperature and, finally, suspension of vital activities.

The whole aim of treatment in acute gas poisoning has been to prevent blood concentration, or else to restore it to a level more nearly normal. When this is accomplished, the individual survives in spite of the fact that the lungs may be very edematous. If it is recognized that changes in the concentration of the blood are responsible for death and that treatment for gas poisoning consists in the restoration of the blood concentration to a level more normal, then it is apparent that there should be criteria which shall give indication of the animal's condition. Such criteria are to be found in changes in temperature and in hemoglobin estimations. It may be stated that either criterion may be used alone, but that greater dependence may be placed on the combination of the two.

TREATMENT

The principle of the method of treatment of acute gas poisoning consists of venesection in the period of blood dilution and of the introduction of fluid into the body during the period of blood concentration. Venesection is practiced as soon as practicable after gassing, to the extent of approximately 0.5 per cent. of the body weight. Hemoglobin and temperature changes are then observed at one-half hour intervals. So long as the temperature remains normal and the blood concentration does not diminish, further treatment is not necessary. When, however, the temperature rises rapidly and a fall in blood concentration occurs (the two changes take place simultaneously), a second venesection of 0.5 per cent. of the body weight is practiced. This procedure may be repeated a second time, that is, until blood to the extent of 1.5 per cent. of the body weight has been withdrawn. In a large majority of cases there is needed no further treatment, and practically every animal survives.

If, in spite of intensive treatment in the first stage, the blood becomes markedly concentrated, and a notable fall in temperature takes place, the condition must be considered very serious, and if the animal is left untreated it will surely die. At this point, of course, infusion of a solution is indicated. The essential feature in the stage of blood concentration is to diminish, if possible, the degree of concentration, and it has been found by experience that it matters little how this is done. Thus, this purpose may be accomplished by the infusion of salt solution, by oral administration of water, or even by intraperitoneal injection of salt solution. Probably one-half the animals in a serious condition in this stage of blood concentration may be saved by following either procedure.

Since edema and a highly concentrated blood lead to deficiency of oxygen in the blood and tissues, the problem of the relation of oxygen administration to the treatment of gas poisoning is presented. It will suffice here to state that oxygen treatment alone in gas poisoning does not save life. This follows from the fact that oxygen administration does not change the concentration of the blood, which is the direct cause of death. When, however, the concentration of the blood is restored to a more nearly normal condition, the addition of oxygen administration to the treatment is of obvious benefit, since under these circumstances the blood regains its normal respiratory functions.

With respect to the treatment of chlorin and chlorpicrin poisoning, the principles enunciated for phosgen hold true. While the principles are the same, there is a difference in the time of application, for, in general, in chlorin and in chlorpicrin poisoning the initial stage of dilution of the blood is lacking. With phosgen, early bleeding and delayed infusion are advocated. With chlorin and with chlorpicrin, early bleeding and early infusion are imperative. Moreover, in chlorin poisoning there is evidence of a significant acidosis; hence, the administration of sodium bicarbonate by mouth is advocated, in addition to the treatment outlined for phosgen. As a result of the treatment outlined, the recoveries are increased threefold.

Aside from the interest which attaches to these principles in the treatment of gas poisoning, they may be of special significance in other pathologic states in which inflammation or edema are especially prominent. A recognition of the salient features attendant on

changes in the concentration of the blood in various abnormal conditions would necessitate new points of view with respect to treatment. It is hoped that in the near future an opportunity may be afforded whereby an extensive investigation may be made with this idea in mind.

CHRONIC LESIONS OF THE RESPIRATORY TRACT

INITIATED BY THE INHALATION OF IRRITATING GASES *

M. C. WINTERNITZ, M.D.
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The majority of the gases which have been utilized in the recent war owe their efficiency to their irritative and escharotic action on the respiratory tract. This action causes an inflammatory edema, which is followed by a cellular exudate, both in the upper air passages and in the pulmonary parenchyma. While the highest mortality occurs in the acute, or edema, stage, a second peak in the mortality curve is encountered with the pneumonia process. The type of the latter inflammatory reaction is largely determined by the extent of the primary destruction. Many gases produce such deep seated necrosis that if death does not ensue in the acute edema stage or at the height of the pneumonia process, organization of the exudate within the alveoli and, more frequently, of that in the bronchioles, may occur. The contraction of the scar may lead to serious and progressive mechanical difficulties, not only with the ingress and egress of air into the alveoli, but also with the pulmonary circulation, and ultimately with the aeration of the blood in the lungs. Chronic suppurative inflammatory processes, too, may persist, especially in the bronchi, with a typical picture of a tubular, or even of a saccular, bronchiectasis or bronchiolectasis.

The various gases of the respiratory irritant group have a similar action, but differ in the localization and extent of their necrotizing effect. A brief review of the pathology of mustard gas, chlorin and phosgen will emphasize this difference.

Not only does mustard gas, in lethal concentrations, destroy the lining of the entire bronchial tree, but its necrotizing action involves the lung itself. In more dilute form, it produces necrosis of the epithelium of the trachea, which, however, becomes less marked toward the finer ramifications of the bronchi. The gas seemingly spends itself in the upper air passages. It either does not reach the bronchioles and alveoli, or it reaches them in such a diluted or changed state that the occurrence of chronic pulmonary lesions after this gas is rare.

After chlorin inhalation, there is also an injury to the lining of the entire respiratory tract, even to the ducti alveolares and to the alveolar walls themselves. The epithelium is blistered, but the necrosis in the trachea and in the larger bronchi is not as deep and extensive as it is with mustard gas. Probably on account of its less efficient corrosive action, the injury of the pulmonary parenchyma, not so severe even in the acutely fatal cases, results more frequently in chronic lesions, which may cause death long after the initial symptoms have passed.

Phosgen has the least severe action on the respiratory tract, but in its wake the most frequent and persistent lesions are left. Organization of bronchiolar and peribronchiolar exudates, with obliteration or dilatation of the lumina of the bronchi, leads naturally to serious and progressive obstruction to the passage of air and the circulation of blood in the lungs.

That there is immediate death of the epithelial lining cells of the respiratory tract after exposure to these poisonous gases may be demonstrated with vital stains. Within two hours after inhalation of chlorin, dogs whose circulation had been previously heavily laden with trypan blue show deep blue nuclei in the mucous membrane of the trachea, bronchi and bronchioles, and even a staining of entire alveolar walls.

This injury is the anatomic expression of the destruction of the normal protective mechanism of the upper respiratory tract, and is followed by an invasion into the lung of the bacterial flora of the mouth. This has been demonstrated repeatedly by mouth cultures before exposure to poisonous gas, and by subsequent cultures, not only of trachea and bronchi, but also of the lung itself.

It has been shown that the high mortality in the most acute or edema stage is not due to the accumulation of fluid within the air sacs. Pulmonary edema must be regarded as the expression of a more deep seated process, and in itself is probably never a satisfactory explanation for death. When death does not terminate the process, the inflammatory exudate which supervenes is readily explained by the presence of large numbers of bacteria that find in the trachea and lung, injured by the action of the gas, a fertile medium for development.

Interesting as these two stages may be, it is most important to recognize that the primary escharotic action of these gases frequently leads to much more extensive lesions of the respiratory tract than are usually encountered. Even though the animal may survive, the necrotizing tracheitis, bronchitis and pneumonia characteristic of the acute stages do not allow restoration to normal of the respiratory tract. The initial damage is followed by organization, which may be sufficiently extensive after mustard gas inhalation to produce stenosis of the larynx or trachea. After chlorin, phosgen, superpalite, cyanogen bromid, chlorpicrin, etc., a progressive fibrosis with obliteration or dilatation of the smaller air passages may result. This occurs not only when the acute effects of the gas have been manifest, but, with the phosgen group especially, it may follow even when no marked expression of acute damage has been observed. With bronchiectasis, metastatic infection in the parenchymatous organs has been noted; but in general the changes, both during the life of the animal and at necropsy, are characteristic of this condition. With obliteration of the smaller air passages, pulmonary emphysema and atelectasis lead to a progressive respiratory disturbance which is much more manifest with physical exertion.

For the present, the chronic or residual lesions, after inhalation of these poisonous gases, are decidedly the most important. It seems possible that graded respiratory exercises may prevent the contraction of the scars in the finer ramifications of the bronchi during the period of their formation and, in this way, aid at least, in the amelioration of the distressing condition which may follow.

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* From the Department of Pathology, Yale University School of Medicine.

* Read before the Section on Pathology and Physiology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MARSHALL, UNDERHILL AND WINTERNITZ

Dr. A. M. Pappenheimer, New York: I should like to ask Dr. Marshall if he came to any conclusion as to whether the intestinal lesions following the injection of mustard gas were due to the elimination of the gas by the intestine. Lesions of the alimentary tract were found in a certain proportion of the human cases, sometimes erosions of the stomach, sometimes hemorrhages in the small intestine; but we could not decide whether they were an essential of the pathologic picture of mustard gas poisoning. As regards the possible systemic toxicity in the human, there are certain suggestive observations. There was a group of cases in which the burns of the skin or of the respiratory tract did not seem to account for the severity of the symptoms, cases with widespread pigmentation, great prostration and apathy, low blood pressure and curious mental symptoms. Another bit of evidence in favor of the systemic effect is the marked leukopenia present in severely gassed patients, as described by Zunz and Krumbhaar, and observed also after intravenous injection in rabbits. In regard to the experimental methods of treatment brought out by the work of Dr. Underhill, there is unfortunately one factor which complicates their application in the human cases of phosgen poisoning, that is the early onset of bacterial infection. We did not have an opportunity to examine material from a large series of phosgen cases, but of four acute cases, the patients dying within twenty-four hours after gassing, several manifested even at that time a widespread streptococcic invasion of the lungs.

Dr. Winternitz's paper is of special importance in its emphasis on the permanent changes in the respiratory organs, which may develop after gassing. He has described in detail the late results of phosgen poisoning, but I am sure the changes after mustard gas poisoning must be equally important. Although many detailed studies have been made of early cases of mustard gas poisoning, the one practical question which remains now is to find out to what extent permanent lung injury is to be expected and how far that is going to explain the persistent disability in many of the gassed soldiers. In addition to the not infrequent development of bronchiolectases and bronchiectases, we have been struck by the very regular occurrence in the later mustard poisoning cases, of a widespread metaplasia of tracheal and bronchial epithelium into the squamous cell type. We are not yet able to state whether this is a permanent change, but as a possible predisposing factor in favoring the onset of secondary bacterial infections, it seems to be worth noting.

Dr. E. R. Le Count, Chicago: I wish to ask Dr. Marshall about the hemorrhages observed in the stomach and bowel and as to whether they might be explained by the changes in blood volume and circulation, and, therefore, whether they may be, perhaps, in a small degree analogous to infarction hemorrhages.

Dr. W. M. L. Coplin, Philadelphia: One of the important things to remember is the influence of desquamation and deciliation. These patients come in at varying periods after gassing, some after a week, at which time the ciliated epithelium has disappeared from the trachea and cannot be demonstrated postmortem even in the bronchi. I have seen gangrene in these lungs twenty-six days after gassing and I have seen some tracheal mucosa resemble the dense skin of pachyderms with superposed eczematous surface. The mucosa would break in fissures when the bronchus was opened, so that the passage has not only lost the normal method of removing contained discharges by means of ciliæ, but the rigidity of the tube is such that the coughing mechanism is destroyed even assuming that bechesthesis still persists or is possible. A very interesting symptom is the paroxysmal attacks that come on any time from days to weeks after gassing. These patients will sometimes be going about the hospital grounds when they are seized with intense dyspnea, air hunger and cyanosis; occasionally a grayish pallor is present. This may be preceded by or follow cyanosis and occasionally is terminal only. One naturally thinks that these are instances of recurring edema, which no doubt is a factor, but in reality they are simply cases where desquamation, with packing of pus and cell detritus causes bronchial obstruction, with possibly some element of spasm. I have seen the bronchus completely filled with necrotic masses. If the changes are not too great and infection does not supervene, some occluded tracks go on to organization. Intestinal ulceration may be present; pyloric or duodenal ulcer is not seen frequently; ulcers in the small intestine, duodenum and stomach are not unlike those associated with extensive burns of the skin. We cannot help thinking of the same explanation, because for a week or ten days the appearance is not what is observed after severe burns. I do not believe that severe destructive lesions in the bronchi will ever reciliate. It is surprising to what degree clinical recovery may progress.

Another interesting feature that we had an opportunity to observe is the susceptibility of gassed patients to respiratory irritants. There is a hypersensibility of the bronchial mucosa. Often these patients cannot endure the least trace of smoke. I believe that the irritability occurs in practically every instance. One other point is the change in the walls. One may see areas in the mucosa fairly well preserved, and immediately adjacent or extending in irregular plaques, usually in the long axis of the tube, there is an area of extensive necrosis with sometimes a definite ulcer and sometimes with a hard, breakable mucosa. I think Dr. Le Count's explanation that it might possibly be due to infarction, is worthy of acceptance. The intense hemorrhage in the intestine seen in some of these cases, resembles acute hemorrhagic septicemia, and it is quite possible that it is due to infection; certainly a few weeks following injury the lungs are often found as full of bacteria, almost, as are lungs that have been retained postmortem outside the body. I saw very few cases of gassing in the early stages, but never one in which bacteria were not abundant in secretions and pulmonary tissue. In the early hours, certainly within twenty-four hours, the bacterial invasion is frequently streptococcic, often intense, and more gas bacilli may be found in these lungs than in those of patients who have died of gas gangrene.

Dr. H. E. Robertson, Minneapolis: I have had the opportunity of observing both clinically and at postmortem the skin reactions in gassed soldiers who had a varying amount of pigmentation of the skin. I can confirm Dr. Marshall's observation that the negroes are comparatively insusceptible. We had side by side in one hospital negro troops and white troops, who had suffered about the same exposure and the whites were burned more severely than the negroes. While the negroes were comparatively free from skin burns, their respiratory tracts were as severely affected, if not more so, than those of the whites. We investigated the question of relative susceptibility between dark and fair skinned individuals, but we could not determine that the blonde types are more susceptible than the brunette types. May I ask Dr. Marshall how he believes the negro's pigmentation acts as a protector of the skin? Also is there any protection against mustard gas given by the darker skin of white people? I confirm Dr. Pappenheimer's observations in regard to bacterial invasion of the respiratory tract. I have never seen a case where the bacteria were not numerous. We found an interesting series of cases in which all evidences of intoxication had disappeared and after ten or twelve days the patients were apparently progressing toward convalescence. Some of these patients were then moved to the ambulatory rooms in the wards and were pronounced on the road to recovery. These patients would suddenly develop a bronchitis, bronchopneumonia and die. At the time of the postmortem in these cases it was clearly evident that the lesion produced by the gas had not cleared up, and why they should show such marked improvement physically and mentally when their bronchi were in such dangerous condition, I cannot understand, except that there is a return to normal of the blood. This secondary infection, because it was a secondary infection which took these patients, was generally extremely virulent. Streptococci, pneumococci and often influenza bacilli were found.

DR. W. M. L. COPLIN, Philadelphia: Regarding this question of skin susceptibility, I know one officer who had a severe gas burn involving most of his face outside of the shaven beard line. I asked what his explanation was regarding the escape from burn of the shaven portion of the face; he said he had difficulty in shaving, his skin was tender and he was in the habit of using some sort of ointment; he did not know what the ointment contained. I was wondering if some constituent of the ointment possibly might have acted as a protective against these gasses.

DR. FRANCIS CARTER WOOD, New York: I suppose no one has seen the early chlorin cases. What about it in experimental animals? Is the infection likely to occur in animals the same as pure chlorin gas poisoning as regards bacterial invasion?

DR. W. M. L. COPLIN, Philadelphia: There are instances of pigmentation occurring in men who had never been gassed sufficiently to blister, or who did not know they had been gassed. It would be interesting to know whether the pigment of these men acted as a protector against irritation. That would warrant some investigation on pigment producing a protective influence independent of the local action.

DR. E. K. MARSHALL, JR., Baltimore: In regard to the intestinal lesions of mustard gas, I have no experiments that would tend to substantiate any definite explanation. It is true that the intestinal lesions in dogs vary from a simple congestion of the intestine with few hemorrhages to a complete hemorrhagic condition of the duodenum and cecum. In regard to these lesions being due to changes in the blood, as Dr. Le Count suggests, or to secondary changes brought abount by gas poisoning, it seems somewhat improbable in that they do not occur with any of the other gases, chlorin, phosgen, etc., which produce the same changes in the blood which mustard gas does. One might possibly expect that the mustard gas is secreted in the bile. We made tests in the bile of animals but have been unable to demonstrate the presence of mustard gas. Of course, it is possible that the mustard gas might be excreted through the cells of the intestines. No proof is at hand, however. In regard to the question of Dr. Robertson about the skin reaction and the explanation for it, I have an explanation which some data substantiate. The explanation for the conditions in the skin and the susceptibility is based on the following observations: First, it has been found that even a half hour after mustard gas is applied to the skin, if the skin is washed and scrubbed with an organic substance like kerosene in which mustard gas is soluble, the burns can either be prevented or reduced in severity. This shows that you can draw out the mustard gas from the skin a half hour after it is applied. If one covers the area with a glass cap so as to prevent evaporation of the mustard gas a much more severe burn results. The fact is that the sensitive man absorbs more gas than the nonsensitive man absorbs. We can make a definite exposure on the arm of the sensitive man and immediately after exposure apply the arm of the resistant man and the sensitive man will not burn, whereas the resistant man will. In other words, the resistant man can extract the gas from the sensitive man. We have come to the conclusion that sensitivity depends on the amount of fat and lipoids present in the skin. In a resistant man the gas is first absorbed in the fats and lipoids, there being a large reservoir of fats and lipoids in his skin. It is slowly evaporated and slowly carried inward into the cells where the damage is done. The transfer is so slow that there is never in the cells a concentration above the threshold. The sensitive man having a smaller amount of fats and lipoids is more apt to be damaged by the gas. In answer to Dr. Coplin's question, I think that is quite possible. You can get quite a severe burn with mustard gas which in some instances will not cause any pain and which will lead to pigmentation.

DR. FRANK P. UNDERHILL, New Haven, Conn.: With respect to the first question on the treatment of lethal gas poisoning and the difference between the acute attacks and attacks of infection in the human cases, the same holds true in animals. Just a few hours after gassing you may have this same type of infection. The type of treatment which we outlined is effective only when the individual has been received shortly after gassing. If ten, twelve or fifteen hours have elapsed previous to any attempt at treatment, then this treatment is quite unsatisfactory. At the time the armistice was signed attempts were being made to facilitate transportation to the gas hospitals so that treatment could be obtained earlier than had hitherto been possible. In answer to Dr. Wood's question, I will say, no.

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LEONARDO DA VINCI AS ANATOMIST
(1452-1519)

When Leonardo da Vinci died (May 2, 1519) his anatomic notes and sketches passed by will to his faithful friend Melzi who, while he lived, guarded them as his most precious possessions; but unfortunately this reverence did not pass with them to his heirs. Yet, notwithstanding their extensive, roundabout, and still in large degree untracked travels, a very large part of Leonardo's anatomic manuscripts and drawings at last found safe abodes and became available for study and reproduction under favorable conditions.[1] How much has been lost will never be known. The quadricentennial anniversary of Leonardo's death has brought out a number of articles[2] in which his work, particularly in anatomy and physiology, is discussed in the light of the latest investigations that anatomists, historians and linguists have made of it.

It appears to be established beyond any question of doubt that Leonardo commenced to dissect when he was about 37 years old in the hospital of Santa Maria Nova in Florence, that he continued this work in Milan, and that he dissected in Rome in 1513, when he was 61 years old, at which time Leo X forbade further work of that kind. It is stated that in all he dissected more than thirty bodies of men and women at various ages, besides various animals. Nor is there any longer any question about the absolute originality and complete independence of his anatomic work, which he carried far beyond the requirements of anatomy as pertaining to art. This is shown in the remarkable circumstance that he paid more and closer attention to the internal organs than even Vesalius or the other anatomists of that period. What interest has the artist in the cerebral ventricles, the internal arrangement of the heart, the course of the deeper nerves and vessels? It was a great love of anatomic and physiologic investigation, of science, that led him to work on and on through the years, stealthily, no doubt, with poor illumination and under many other difficulties, but to what amazing results!

Hopstock, one of the editors of Leonardo's Windsor manuscripts,[3] himself an anatomist, after a careful review of all the published manuscripts, gives in essence this estimate of Leonardo as anatomist:

No one before him dissected so many bodies and no one understood the results of his dissection so well as he; no one before him represented in drawings the muscles, vessels and nerves as they are, which he did; no one before him knew the heart so well, but whether he understood the circulation, or thought he had a definite idea of the correct explanation of the circulation of the blood, remains doubtful. He was the first to describe the uterus as an organ with one chamber, to represent correctly the skeleton, to inject vessels with a solidifying mass, to make casts of the ventricles of the brain, to practice serial sections. As revealed by the notes, which cover a period of thirty years, and his marvelous red chalk drawings and impromptu sketches by the side of the dissected body, his work throughout is characterized by an almost uncanny accuracy, deep physiologic insight, untiring zeal, and an unfailing sense of the beautiful.

The painter of "Mona Lisa" and "The Last Supper" is the first great scientific anatomist, and yet, although he accomplished so much toward a correct understanding of the human body, his work was destined to have no tangible, traceable influence on the immediate development of anatomy and of medicine, because it was not to become known generally until many generations had passed and then only through fragmentary records. Van den Broek[2] points out that Leonardo's work in other sciences also remained sterile in the same sense as his work in anatomy. He is said to have studied the question of aviation over many years and to have declared that the flying machine must be built like the body of a bird so that the aviator "can balance himself and move through the air like a big bird, to the everlasting glory of the nest where he was born."

As further examples of the scope of his interests may be mentioned his studies of plant life, his interpretation of the sea shells on the mountain tops around Florence, and then the note in large letters on one of his sketches: "The sun does not move." A child of free love, disinherited, disliked by his stepbrother, and often misunderstood, Leonardo, after four hundred years, is taking his right place in history as one of the most gifted of men and as one of the most versatile and original of investigators. Perhaps the more remote effects of his work in illustrating the capacity

1. Concerning the fate of Leonardo's manuscripts, one may consult Klebs, A. C.: Leonardo da Vinci and His Anatomical Studies, Bull. Soc. Med. Hist. of Chicago, **4**: 66, 1916.

2. Hopstock, H.: Anatomen Leonardo, Norsk Mag. f. Lægevidensk., 1919. Van den Broek, A. J. P.: The Work of Leonardo da Vinci, Nederlandsch Tijdsch. v. Geneesk. **1**: 1555, 1919.

3. Under the name of Fogli A and B, Sabachnikoff and Puimati in 1898 and 1901 published sixty of the anatomic manuscripts of Leonardo known as the Windsor manuscripts. Fogli A and B contain facsimiles of about 400 drawings with transcription of the notes (Leonardo used mirror writing) and French translation. The rest of the Windsor manuscripts (129) with facsimiles of some 1,050 drawings with transcription and English and German translations have been published by Vangensten, Fonahn and Hopstock under the title Quaderni d'anatomia, I-VI, Christiania, Jacob Dybwad, 1911-1916.

of the human intellect, when directed to intensive effort by self-control and love of nature, will make up for the lost chance to influence the earlier development of science.

ARE THE CAPILLARIES CONTRACTILE?

In ultimate analysis, the nutritive functions of the tissues are closely dependent on the capillary circulation within them. It is only through the medium traversing the smallest vessels of the circulatory system that the living cells secure the oxygen and energy-yielding compounds, on the one hand, and on the other divest themselves of the products which may represent waste of valuable secretions. There exists a general recognition of the fact that the passage of blood through these minute branches leading from the greater highways of transport varies greatly, the rate of flow being very inconstant. The explanation usually given is that, since the capillaries are assumed to be passive structures, these variations in flow within them are probably associated with alterations in the vasomotor conditions of the small arteries or arterioles supplying them. In other words, the rate of flow in the capillary circulation is determined, according to the most prevalent conception, by the state of contraction or dilatation of the corresponding arteriole. Dilatation of the latter will bring about a rise of pressure in the capillary which will correspondingly expand, ready to resume its original form whenever the relief from arterial pressure permits the inherent elasticity of the minute vessel to come into play again.

Certain facts are not easily reconciled with such an explanation. It has been observed many times that even within the same circumscribed tissue the blood may be flowing though some of its capillaries are empty. There are objections to the assumption that these different capillaries have unlike coefficients of elasticity so that they require different pressures to open them. An alternative and comparatively novel hypothesis endows the capillaries with the capacity of active contraction and dilatation. Long ago it was argued that the cell substance in these structures is arranged in strands running from the nuclei around the capillary. By contraction of these strands in some parts of the circulation the vessels were asserted to be narrowed to obliteration.

The original observations on capillary contraction were made by Stricker in 1865 on the nictitating membrane of the frog. Krogh[1] of Copenhagen University has recently presented new evidence showing that the capillaries are not merely passively dilated by blood pressure but constantly perform active changes in caliber. In resting muscles most of the capillaries are in a state of contraction and closed to the passage of blood. In certain cases it was demonstrated that the maximum amount of blood that can be present in the capillaries is not less than 750 times the minimum. The arterial blood supply is not thus variable. Consequently the blood color of a tissue depends practically on the state of contraction of the capillaries and not primarily on that of the arterioles. Krogh is quick to point out the consequent deduction that the capillariomotor regulation must play an enormous rôle not only in muscles, but in the skin and in all mucous membranes, in which changes in color are the most obvious signs of vasomotor influences. The hyperemic condition (in the clinical sense) of any organ is brought about by a large number of capillaries being open and more or less dilated; and in the anemic condition most of the capillaries are closed, and most of those which remain open are more or less contracted.

If a contractile power is widely present in the capillaries it can doubtless be affected profoundly by chemical substances produced as the result of metabolism, either normal or abnormal, in the surrounding tissues. Dale and Richards[2] have intimated a belief in a mechanism capable of regulating capillary tone and situated in the capillaries themselves. This factor has in fact been depended on to support some of the recent hypotheses concerning the genesis of shock.[3] The entire conception of a caliber-regulating potency within the capillary wall, assigning to the minutest vessels powers formerly ascribed solely to the smaller arteries, is all but revolutionary in present-day physiology. Its obvious importance makes added confirmatory researches and the establishment of the nature and susceptibility of the contractile factors imperative.

1. Krogh, A.: The Supply of Oxygen to the Tissues and the Regulation of the Capillary Circulation, J. Physiol. **52**: 457 (May 20) 1919.

FEVER AND THE WATER RESERVE: A PHYSICOCHEMICAL THEORY

In the course of the important studies by Woodyatt[4] and his associates on intermediate carbohydrate metabolism, timed injections of glucose and other substances being given intravenously by means of ingenious motor-driven pumps, it was observed that under certain conditions fever would result.[5] Fever came on when glucose was injected in such quantities that marked glycosuria and diuresis developed, provided that in the mean time, water was withheld until the body lost some weight. Under such conditions chills were noted also. Naturally the thought arose that under these conditions there might not be enough available water left in the body to cool it by evaporation, but of course the possibility that the sugar injections in some way disturbed a nervous heat-regulating center has to be considered.

2. Dale and Richards: Vasodilator Action of Histamine, J. Physiol. **52**: 110 (July) 1918.

3. Tissue Poisons in the Genesis of Shock, editorial, J. A. M. A. **73**: 38 (July 5) 1919.

4. Woodyatt, R. T.: Studies in Intermediate Carbohydrate Metabolism, Harvey Lectures, 1915-1916, p. 326.

5. Balcar, J. O.; Sansum, W. D., and Woodyatt, R. T.: Fever and the Water Reserve of the Body, Arch. Int. Med. **24**: 116 (July) 1919.

Pediatricians have previously discussed these and other possible explanations of so-called sugar, salt and thirst fever, without reaching any definite settlement. The results of the new experiments by Woodyatt and his associates, being made under the best controlled conditions so far attainable, make a significant contribution not only to the study of experimental fever but also to the theory of fever in general. It is remarkable to what heights the temperature of the body may be driven by the method used in these experiments: fever of 111 F. is produced readily, and in one case the temperature of a dog in the course of ninety minutes, rose to 125.6 F., the highest animal temperature on record, as the consequence of a timed intravenous injection of glucose solution during which the fluid output exceeded the intake by 616 c.c. (66.2 c.c. per kilogram). The results show further that increased combustion of glucose is not a necessary factor, and that fever can be produced in dogs that have been rendered poikilothermic by severance of the cervical cord; hence this fever is not dependent on a nervous heat-regulating center.

The outstanding fact in these experiments is that single injections of glucose (and certain other substances like salt and lactose) may produce fever when the body is depleted of water. The condition is similar to the inanition fever of the new-born described by McLane and Crandell, and to the salt and sugar fevers of infants, all of which are relieved by water. These fevers consequently may be looked on as "thirst fevers" due to reduction of the amount of water in the body available for evaporation at the normal temperature. The question arises: Is the fever of the ordinary febrile diseases of the same nature?

Balcar, Sansum and Woodyatt have discussed the possibility that the fever of typhoid and other febrile diseases may be the result of a lack of free water, available for evaporation, because the colloids of the body are changed by the poisons of the infection, so that they take up and bind more water than in health. They point out that this idea receives support from the concentration of the blood and secretions in infectious fevers, the cloudy swelling of the cells, the thirst, and the sudden release of large amounts of water in the urine and sweat when the fever ends by crisis, as in pneumonia. The liters of water given off during a few hours in such a crisis can be accounted for only on the score of water retention during the febrile stage. Whether we shall be able to measure the variations in the amount of free water in the blood that may occur in fevers remains to be determined, but it is not at all unreasonable to expect that a method that might be suitable for clinical use may be devised for this purpose. We know that plenty of water is beneficial in many febrile diseases, but "probably no one has yet daringly pushed the administration of water in fever to the ultimate limits which might be necessary to ascertain whether every fever can be made to disappear entirely if enough water is given."

The results in this direction mentioned by Balcar, Sansum and Woodyatt are, of course, only tentative as yet, and the outcome of the work in progress will be awaited with much interest. For the present, emphasis is placed on the fact that a new, well formulated and well founded theory of fever is advanced, according to which fever may result from the lack in the body of water available for evaporation, and in infectious diseases such lack may be caused by an abnormal increase in the power of the proteins of the body to absorb and bind water. Undoubtedly this physicochemical theory of fever will prove of much value in stimulating experimental work, and it is possible that it may lead to important advances in the treatment of febrile diseases.

THE METABOLISM OF BILE ACIDS

The daily discharge of a pint of secretion containing more than half an ounce (15 gm.) of substances, of which several are chemically unique, into the alimentary tract is a phenomenon that ought to excite considerable interest and speculation. Abnormalities of the biliary functions, to which we obviously refer here, are a frequent problem for surgical consideration as well as a source of pathologic manifestations that every physician is called on to treat. Nevertheless, the physiology of the bile still continues to be enshrouded in no little mystery. The importance of the bile in certain of the digestive functions, particularly in relation to the utilization of fats, has come to be well realized. It is sometimes claimed of late that this secretion acts as a regulator of intestinal putrefaction, because of a slight laxative property whereby the intestinal contents are expelled before bacteria develop in them to any great extent; and perhaps this theory accounts for the occasional employment of bile preparations in therapy. Whether the bile, which has unusual properties as a solvent, on this account represents an excretory vehicle of special importance is also questionable.

There is almost as much uncertainty regarding the origin of the bile constituents as seems to exist with respect to their performance in the organism. Gradually new items of information are coming to light. Many years ago the Genevan physiologist Schiff[1] became sponsor for the belief that there is a "circulation of the bile," by which is meant a reabsorption of bile discharged into the intestine. With respect to the bile pigments, those long known, peculiar biochemical substances, Hooper and Whipple[2] of San Francisco have furnished definite proof that they are not absorbed from the intestine at least. Other recent

1. Schiff, M.: Arch. f. d. ges. Physiol. **3**: 598, 1870.
2. Hooper, C. W., and Whipple, G. H.: Am. J. Physiol. **43**: 264 (Jan.) 1917.

investigations conducted at the George Williams Hooper Foundation for Medical Research at the University of California have greatly enhanced our knowledge regarding the metabolism of the bile acids.[3] In experiments on fistula dogs they have demonstrated anew the familiar cholagogue action of bile, bile salts, and the billiary acids. When these are given by mouth, the increment of excretion is exhibited within the following four to six hours.

This cholagogic effect is apparently not attributable primarily to the amino-acid component of the conjugated bile acids ingested; for taurin (derived from taurocholic acid) has no effect on the output. On the other hand, cholic acid by mouth usually causes a distinct cholagogue effect. Cholic acid fed during long periods of fasting gives a minimal output of bile acids, but fed during full diet periods gives a maximal output of bile acids. This outcome probably depends on the available supply of taurin, which is much reduced after fasting, but is abundantly available during full diet periods. In other words, according to Foster, Hooper and Whipple,[3] cholic acid is the limiting factor which determines the level of bile acid excretion in the bile. The sulphur-containing taurin is derived in all probability from the amino-acid cystin of the food or body protein. Taurin, like its analogue glycocoll, appears to be present in excess of the amount needed to combine with the cholic acid of normal metabolism. Somehow the literature relative to the bile has transmitted the conjecture that cholesterol and cholic acid are in some way genetically interrelated. However, since neither cholesterol fed alone or combined with taurin nor hemolyzed red blood cells caused a change in the excretion of bile acids, Foster, Hooper and Whipple give no credence to the traditional statement.

One cannot study the reports of the California laboratory without gaining the conviction expressed in them that both endogenous and exogenous factors are concerned in the metabolism of bile acids. Thus, in the dog which excretes this acid only, there is a reasonably constant output of taurocholic acid during fasting periods, and the output may be somewhat diminished by feeding carbohydrates. The relative diminution of urinary nitrogen and of bile acid excretion under these circumstances is quite in harmony with the well known protein-sparing effects of carbohydrates in metabolism. It is equally clear, to quote Whipple and his associates, that there is an important relationship between the output of taurocholic acid and the intake of certain food proteins. On certain diets a uniform level of bile acid excretion may be observed for days; and a sudden shift to a similar diet, containing double the amount of food nitrogen, may cause a sudden doubling of bile acid excretion. Meat protein seems to be particularly efficacious.

It is now known that bile pigments can be formed outside of the liver and excreted in the bile secondarily. For the bile acids the evidence points to the liver cells as the essential seat of formation. At any rate, on a standard diet a functionally deficient liver produces far less than the normal amount of bile.

3. Foster, M. G., and Hooper, C. W.: The Metabolism of Bile Acids, I, A Quantitative Method for Analysis of Bile Acids in Dog's Bile, J. Biol. Chem. **38**: 355 (June) 1919. Foster, M. G.; Hooper, C. W., and Whipple, G. H.: II, Normal Fluctuations in Healthy Bile Fistula Dogs, ibid., p. 367; III, Administration by Stomach of Bile, Bile Acids, Taurine, and Cholic Acid to Show the Influence on Bile Acid Elimination, ibid., p. 379; IV, Endogenous and Exogenous Factors, ibid., p. 393; V, Control of Bile Ingestion and Food Factors, ibid., p. 413; VI, Origin of Taurocholic Acid, ibid., p. 431.

Current Comment

ANTHRAX

During the past eighteen months, attention has been especially directed to anthrax in this country by the considerable number of shaving brush cases reported from various army camps. But, for some years before the United States entered the war, anthrax had apparently been gaining in frequency and had been a cause of increasing concern to health officers in many places. In Massachusetts, twenty-five cases were reported in 1916 during a period of little over four months, and in Louisiana in the same year ten cases were reported in a single month. Other recent cases have occurred in Mississippi, Wisconsin, New Jersey, Connecticut and Kansas. In the whole United States there have been probably at least fifty deaths a year from anthrax since the beginning of 1915. As is well known, anthrax is primarily a disease of herbivorous animals and is communicated to man chiefly through contact with hides and other animal products. It is believed that the disturbance of the usual channels of import by the war, combined with the scarcity of labor, has led to a less efficient preliminary disinfection and so has permitted the introduction of anthrax-contaminated hides, bristles, etc., from parts of Asia and South America. The present increased scarcity of leather is likely to draw still further on out-of-the-way and uncontrolled sources. There are only about twenty establishments in the United States that manufacture shaving brushes, and the U. S. Public Health Service has found the widest range of practical efficiency in their methods of sterilizing the hair or bristles. Safety, however, can be very simply attained. Boiling or steaming the hair has been found a satisfactory means of treatment. The apparent increase of anthrax cases due to contaminated shaving brushes raises the question whether there has been a real increase in infection or whether the better opportunities for early diagnosis and bacterial examination are responsible for bringing to light a larger proportion of cases. It is to be hoped that, for some time to come, infections simulating anthrax whether in country or city will be scrutinized with this possibility in mind. The increase in anthrax that occurred before our own mobilization suggests that the infection may have been even more widespread than was recognized. At all events, the future development of this dangerous dis-

ease should be watched with care. The Public Health Service has found reason to state recently that "without doubt there are now in the market many brushes which are potentially dangerous."

EARLY AWARDS OF THE WAR RISK INSURANCE BUREAU

The Federal Board for Vocational Education has recently published an analysis of the awards of compensation for disability in the first 15,245 cases examined and adjusted by the War Risk Insurance Bureau. It represents approximately reports of awards to June 20, 1919, and will serve to give some advance indication of the types of specific disabilities most frequently demanding consideration. We have already pointed out that during the present war only 2 per cent. of the disabilities are attributed to loss of limbs, whereas in the industries 26,000 limbs, equivalent to six times the number of amputations among American soldiers in the year of war, are lost each year. Hence the justification for the pertinent query reiterated by government publications until it has almost become a postwar slogan: "As soon as we have made peace in Europe can't we do something to prevent the wounding of workmen at home?" Nearly one half (46.6 per cent.) of the cases with a specified class of disability in the War Risk Insurance Bureau report are comprised under the title "Disease," in contrast with amputations, ankylosis, injuries, impairment of sight or hearing, paralysis, etc. Tuberculosis has first place with a record of more than 3,000 out of a total of 7,103 disease cases. Heart affections take second rank in the frequency of their incidence. Arthritis, empyema, nephritis, pneumonia, pleurisy and rheumatism each represent about 2 per cent. of the "diseases" recorded. Next in the order of frequency were the injuries not involving amputations or ankylosis. Out of the 26 per cent. of disabilities in this class, the arms and legs were most frequently involved. Total blindness was not a prominent misfortune; it included only twelve out of 536 cases of impairment of vision. Two hundred and eighty-six persons were accepted as "gassed." Out of the entire number of claims, 74 per cent. were awarded a compensation of $30 a month, most of the remainder receiving a slightly higher allowance.

THE CARRIER PROBLEM IN MENINGITIS

"With the advance of scientific research our old pet theories go on the scrap heap while new theories are evolved. Now that transmission of disease through the air and by fomites has been disproved, the present explanation is that communicable disease is transmitted only by means of infected persons, unrecognized cases and healthy carriers." This statement by Shaw,[1] which many will hesitate to accept in toto, forms the basis for an appeal for public health legislation in regard to the carrier problem. A questionnaire sent to the various state departments of health brought answers showing how unlike are the methods pursued in different localities with respect to the carriers of meningitis organisms. As Shaw has demonstrated by the record of a so-called sporadic case of meningitis on an isolated farm in which a visiting soldier was found to be responsible for the infection, it is no longer sufficient merely to isolate the known cases—a procedure which constitutes the sole preventive measure in certain states. In this country the extremes of attitude are represented, on the one hand, by a state like Missouri, in which the state board of health has no statutory authority in the case of communicable diseases, and on the other hand, by New York. There contact carriers are excluded from public assemblies. If the patients with meningitis are not isolated, others in the household are quarantined. Carriers are made subject to special rules and regulations of the state department of health. Patients are isolated, if possible, until three successive cultures from the nasopharynx at intervals of not less than five days are free from meningococci. If we recall the assertion that there are ten carriers to every patient,[2] and that "carriers beget carriers," it must be manifest that some uniform legislation regarding the latter is highly essential if substantial prophylactic progress is to be made. No state can succeed, however careful its preventive measures against infection may be, so long as an indifferent neighbor neglects an obvious hygienic duty.

1. Shaw, H. L. K.: The Cause of a "Sporadic" Case of Cerebrospinal Meningitis, Am. J. Dis. Child. **18**: 101 (Aug.) 1919.

REPORT OF HEALTH INSURANCE COMMISSION OF THE STATE OF ILLINOIS

Elsewhere in this issue[3] appears a summary of the report issued by the Health Insurance Commission of the State of Illinois. This statement of conclusions will afford a brief insight into some of the problems investigated by the commission. The report affords, moreover, a most valuable study of a number of medical sociological problems which should be read with interest by every physician who is interested in the social aspects of his profession. It includes, in addition to its investigation of the extent, cost, causes and results of sickness and death among wage earners and their families, sixteen special investigations. These concern a study of dispensaries and clinics in Illinois, occupational diseases, the health of coal miners, fraternal insurance, the present status of health work in the public schools, and an analysis of sickness insurance as it has developed to date in Germany, Great Britain and the United States. The material seems to have been carefully worked up, and the report contains such valuable data that it will be of decided help to sociological workers.

2. Simon, C. E.: Human Infection Carriers, Philadelphia, Lea & Febiger, 1919.

3. General News, p. 703.

Group Medicine.—Certainly the time has come when, on the one hand, the coming together of physicians for organized practice should be permitted both by law and by public opinion. On the other hand, no such organization, whether called a hospital, a mutual medical organization, or any other group, should be permitted to carry on the diagnosis and treatment of disease except under some form of public supervision.—M. M. Davis, *Am. J. Pub. Health* **9**:360, 1919.

Medical Mobilization and the War

Personnel of the Medical Department

For the week ending August 22, there were 8,166 officers in the Medical Corps, a decrease of 729 from the previous week. The Medical Reserve Corps contained 3,287. The total number of physicians discharged since the beginning of the war is 23,967.

Military Surgeons to Meet

The Association of Military Surgeons of the United States will hold its 1919 meeting in St. Louis, October 13 to 15, under the presidency of Henry P. Birmingham, Brig.-Gen., M. C., U. S. Army. Dr. Nathaniel Allison is chairman of the local committee of arrangements and has appointed the following chairmen of subcommittees: program, Dr. Eugene L. Opie; reception, Dr. Walter Fischel; entertainment, Dr. William H. Mook; finance, Dr. Hanau W. Loeb; ladies, Dr. Vilrag P. Blair, all of St. Louis. This is the first meeting of the association since the end of the world war and some questions of considerable importance are expected to be decided during the session.

Senate Passes Bill for Retiring Army Nurses

The United States Senate has passed a bill introduced by Senator Wadsworth of New York to authorize the retirement of the members of the United States Army Nurse Corps. The measure provides that members of the Army Nurse Corps who have twenty years' active service, including time served as contract nurses, are to be placed on a retired list and receive 75 per cent., exclusive of foreign pay, of the amount they were receiving on active service. The measure has been referred to the House of Representatives for action, and it is thought that the House will pass it. Members entitled to the benefits of this act must make application to the Secretary of War. The measure passed the Senate without a roll call.

New Division in Surgeon-General's Office

A division of coordination, organization and equipment has been created in the Office of the Surgeon-General, with Alexander N. Stark, Col., M. C., as chief, and Albert P. Clark, Col., M. C., and Arnold D. Tuttle, Col., M. C., as assistants. The object of this division is to study medical department organization, with a view to recommending improvements, to maintain liaison with the corresponding divisions of other bureaus, with a view to standardization, equipment, transportation and activities in general; to revise, produce and maintain up to date all medical department service manuals; prepare organization charts and graphics of medical department activities for peace and war; to prepare and maintain tables of organization affecting the medical department; study the provisions of all general orders, circulars, etc., involving medical department policy prior to publication, and to perform such other functions as from time to time may be designated by the Surgeon-General.

Pictorial History of Medical Service

A pictorial history of the activities of the Medical Department of the Army during operations overseas, comprising about 75,000 feet of motion pictures, and 10,000 still pictures, has been turned over to the Surgeon-General's Office. Two prints of each picture made were filed and cross-filed according to organization, number and region. Fifteen pictures were taken of each hospital, showing personnel and aerial view of the buildings, views of the operating rooms and wards, sanitary features, views of patients and views of men under operation (the latter designed for instruction purposes), views of medical officers and men and surgical operations. Some of the pictures taken at the front show field hospitals and evacuation hospitals receiving and removing patients, medical supply depots, medical officers and men working in the field, and equipment they carried, showing contrast between what the personnel are taught in training camps in this country and how they actually work on a battlefield. The pictures show regimental surgeons going to the aid of men stricken on the field.

HONORABLE DISCHARGES, MEDICAL CORPS, U. S. ARMY

NOTE.—In the following list, L. signifies lieutenant; C., captain; M., major; L. C., lieutenant-colonel; Col., colonel.

ALABAMA

Athens—Glaze, A. L., Jr. (M.)
Birmingham—Jackson, R. (C.)
Mason, J. M. (M.)
Nelson, R. (C.)
Sherrill, J. D. (C.)
Simpson, H. M. (C.)
Garden City—Sudduth, T. H. (L.)
Midway—Rankin, H. P. (C.)

ARIZONA

Bisbee—Charleston, V. C. (L.)
Globe—Kennedy, R. D. (C.)
Sturgeon, C. T. (L. C.)

ARKANSAS

Arkadelphia—Moore, J. S. (C.)
Bauxite—Scott, H. (M.)
Bay—Raines, H. L. (L.)
Harrison—Barker, N. L. (C.)
Hartford—McKellar, G. G. (C.)
Judsonia—Feits, W. R. (L.)
Little Rock—Browning, H. W. (L.)
Wagley, P. V. (C.)
Watson, A. C. (L.)
Russellville—Wright, J. (C.)
Scott—Wells, J. B. (C.)
Texarkana—Smiley, H. H. (M.)
Wabash—Eubanks, G. W. (C.)

CALIFORNIA

Agnew—Myers, G. E. (C.)
Burlingame—Kiersted, H. S. (M.)
Culver City—Simpson, B. R. (M.)
Fresno—Mitchell, C. O. (C.)
Lankershim—Smart, E. P. (C.)
Los Angeles—Bay, S. G. (C.)
Bayley, W. A. (C.)
Frary, B. S. (C.)
Commons, E. L. (C.)
O'Reilly, T. W. (M.)
Schaefer, J. H. (L.)
Steinberg, J. (M.)
Ware, J. C. (L.)
Moneta—Bensinger, C. H. (C.)
Oakdale—Doane, B. L. (M.)
Oakland—Drucks, E. S. (C.)
Pittsburg—Marks, S. H. (C.)
San Francisco—Davis, A. L. (C.)
Greenwood, E. N. (C.)
Kerr, W. J. (M.)
Powers, R. A. (L.)
Soldiers Home—Bishop, W. D. (C.)
Sonora—Wrigley, G. C. (L.)

COLORADO

Boulder—Jolley, W. A. (L. C.)
Denver—Pecony, J. W. (C.)
Fair Play—Dunkle, F. (L.)
Kremmling—Young, J. J. (C.)
Ouray—Cook, L. C. (L. C.)
Salida—Phalen, C. S. (C.)
Steamboat Spring—Blackmer, F. J. (C.)

CONNECTICUT

Bridgeport—Hawley, G. W. (L. C.)
Taylor, C. C. (C.)
Hartford—Weld, S. B. (L.)
Litchfield—Keller, J. E., Jr. (M.)
New Haven—Hynes, F. H. (C.)
Recca, J. (L.)
Stewart, H. E. (L.)
New London—Lee, H. M. (L. C.)
Norwich—Blackmar, J. S. (C.)
Waterbury—Ciminera, J. A. (C.)
Jackson, A. J. (C.)

DELAWARE

Milford—Marshall, S. M. (C.)
Marshall, W., Jr. (M.)

DISTRICT OF COLUMBIA

Washington—Bell, C. (C.)
Moore, W. C. (L. C.)

FLORIDA

Fort Myers—Parnell, H. E. (C.)
Gainesville—Pickett, W. H. (C.)
Jacksonville—Birge, E. G. (C.)
Limbaugh, L. M. (C.)
McKenzie, A. C. (L.)
Micanopy—Feaster, O. O. (M.)
Tampa—Efird, L. J. (L. C.)
Walnut Hill—McClure, H. A. (L.)

GEORGIA

Atlanta—Blackmon, R. L. (L.)
Waits, C. E. (L.)
Cedartown—Hall, H. M. (L. C.)
Charing—Cook, J. M. (L.)
Gainesville—Banister, H. G. (L.)
Crow, H. E. (L.)
Macon—Daniel, O. (L.)
Midland—Jenkins, W. F. (L.)
Rome—Dean, W. A. (L.)
Savannah—Hesse, H. W. (C.)
Kieffer, U. M. (C.)
Lovelace, T. C. (L.)
Rubin, H. (M.)
Soperton—Thompson, E. P. (L.)
Sylvania—Faggart, G. H. (C.)
Thomasville—Lawson, E. L. (L.)
Toccoa—Isbell, J. E. D. (L.)
Washington—Wood, O. S. (C.)
West Green—Hall, W. L. (C.)

IDAHO

Moscow—Dodd, J. A. (M.)
Pocatello—Sprague, C. H. (C.)
Wallace—Quigley, F. L. (C.)

ILLINOIS

Carthage—Frazier, W. P. (L.)
Chicago—Arzt, G. E. (L.)
Beers, B. R. (C.)
Boone, J. F. (C.)
Brereton, G. E. (L.)
Carr, A. M., Jr. (C.)
Cobb, R. B. (C.)
Coffier, M. S. (L.)
Conway, B. P. (C.)
Dowson, A. W. (L.)
Gray H. (L.)
Harner, L. H. (L.)
Kleinpell, H. H. (M.)
Kostrzewski, M. J. (L.)
Lindholm, H. O. (C.)
McMullen, C. J. (L.)
Miller, W. H. (L.)
Opitz, J. H. (L.)
Renn, T. H. (C.)
Roche, N. J. (L.)
Ross, V. A. (L.)
Rowell, C. L. (L.)
Ryerson, E. W. (M.)
Thometz, F. P. (L.)
Weldy, F. M. (C.)
Dahinda—Bedford, R. J. (L.)
Dana—Saul, O. R. (L.)
Evanston—Fogo, H. M. (C.)
Freeport—Rideout, W. J. (C.)
Galesburg—Maley, W. H. (M.)
Homewood—Scupham, G. W. (M.)
Jacksonville—Ewerhardt, P. J. (L.)
Joliet—Fahrner, A. H. (L.)
Keithsburg—Childs, A. B. (L.)
Litchfield—Zoller, C. H. (C.)
Mendota—Cook, E. C. (L.)
Oak Forest—Richman, S. H. (C.)
Oregon—Cottlow, B. A. (L.)
Patterson—Muren, A. L. (L.)
Rockton—Mauricau, V. (L.)
Savana—Schreiter, J. B. (C.)
Wood River—Gillis, H. M. (C.)

INDIANA

Berne—Jones, H. O. (C.)
Bluffton—Redding, J. L. (L.)
Booneville—Wilson, U. R. (L.)
Daleville—Kilgore, F. T. (C.)
Depauw—Sutter, C. C. (L.)
Earl Park—Bundy, C. T. (C.)
Elkhart—Hetsler, O. L. (C.)
Evansville—Davidson, W. R. (C.)
Walden, R. M. (C.)
Frankfort—Lutes, D. L. (C.)
Goshen—Kirby, G. W. (C.)
Greensburg—Gray, E. C. (L.)
Hope—Heilman, W. C. (L.)
Indianapolis—Frazier, C. N. (L.)
Gick, H. H. (L.)
Guthrie, G. L. (M.)
Hendricks, R. G. (C.)
McElroy, J. L. (M.)
Mumford, E. B. (C.)
Overshiner, L. (C.)
Kokomo—Bock, C. L. (C.)
Thompson, B. A. (M.)
La Porte—Thompson, H. J. (C.)
Maxwell—Clayton, S. D. (C.)
Michigan City—Kerrigan, J. V. (L.)
Milford—Young, F. J. (C.)
Mooresville—Cook, G. M. (L.)
Muncie—Molloy, W. J. (C.)
Nineveh—Chenoweth, E. B. (C.)
Nobleville—Haworth, G. D. (C.)
Richmond—Hunt, G. B. (C.)
Russiaville—Oilar, A. L. (L.)
Rushville—Coleman, W. S. (C.)
Seymour—Kyte, E. G. (C.)
Shelbyville—Waltermire, T. C. (C.)

Sheridan—Johnson, P. S. (L.)
Terre Haute—Casey, O. (L.)
Wakarusa—Amick, C. L. (L.)
Zenas—McFarlin, C. C. (L.)

IOWA

Carroll—Shirley, W. M. (L.)
Cedar Rapids—Cooper, T. C. (L.)
Center Point—Doty, C. H. (L.)
Council Bluffs—Henninger, L. L. (M.)
Eagle Grove—McNaughton, L. D. (L.)
Fort Dodge—Jones, S. D. (L.)
Gilmore City—Jones, C. L. (M.)
Hornick—Palmquist, N. (C.)
Independence — Lindsay, S. C. (M.)
Shellito, J. C. (C.)
Lacona—Cruzen, J. L. (L.)
Letts—King, E. R. (C.)
Nora Springs—Shenoweth, C. E. (C.)
Struble—Rubel, H. F. (L.)
Waterloo—Everall, B. C. (M.)

KANSAS

Coldwater—Ireland, E. M. (L.)
Fulton—Jones, T. L. (C.)
Great Bend—Russell, M. F. (L.)
Kansas City—Palmer, W. R. (C.)
Niles—Haerle, E. J. (L.)
Richmond—Smith, D. H. (L.)
Topeka—Billings, A. E. (C.)

KENTUCKY

Allensville—Farmer, J. L. (M.)
Bowling Green—Neel, W. H. (C.)
Cadiz—Morris, J. H. (C.)
Colesburg—Craig, T. E. (L.)
Cromwell—Smith, H. (L.)
Hopkinsville—Rudd, T. D. (L.)
Lexington—Reddish, W. D. (M.)
Louisville—Dwyer, G. F. (C.)
Goodman, A. O. (C.)
Grant, E. O. (M.)
Hibbitt, C. W. (L. C.)
Miller, O. R. (C.)
Richardson, C. (C.)
Shacklette, J. P. (L.)
Webb, R. A., Jr. (C.)
Madisonville—Sory, R. (L.)
Nicholasville—Denman, F. E. (L.)
Pembroke—Thomas, I. (C.)
Pryorsburg—Miller, Y. Y. (L.)
Quicksand—Brown, B. M. (L.)
Redbird—Inman, E. L. (L.)
Simmons—Lake, W. (C.)
Vine Grove—Montgomery, E. W. (C.)
Waverly Hill—Trabue, E. M. (C.)

LOUISIANA

Baton Rouge — Paulsen, T. C. (M.)
Locust Ridge—Adams, J. M. (C.)
New Orleans—Adiger, D. D. (C.)
Chetta, F. (L.)
Edrington, N. K. (L.)
Leckert, E. L. (C.)
Meyer, M. F. (L.)
New Roads—Cazayaux, J. F. (L.)

MAINE

Boothbay Harbor—Barrows, H. C. (L.)
Cherryfield — Cummings, D. F. (C.)
Damariscotta — Loughlin, J. W. (M.)
Lewiston—Stevens, H. E. E. (C.)
Portland—Foster, T. A. (C.)
Winch A. W. (C.)
Saco—Powell, L. L. (C.)
Sangerville—Freeman, F. H. (L.)
Searsmont—Kinghorn, C. W. (C.)
South Paris—Stewart, D. M. (C.)
Wytopitlock — Johnson, H. W. (C.)

MARYLAND

Baltimore—Douthirt, C. H. (C.)
Gailey, H. A. (L.)
Geraghty, W. R. (C.)
Growt, B. H. (L.)
Sisco, H. N. (C.)
Ullrich, J. H. (L. C.)
Vest, C. W. (C.)
Brookeville—Janney, J. H., Jr. (C.)
Crisfield—Norris, R. R. (M.)
Hyattsville—Woodruff, C. (C.)
Jarhoesville—Bean, P. J. (L.)
Kensington — Shorkley, T. M. (C.)
New Market — Magruder, C. L. (C.)
Oakland—Mitchell, H. S. (L.)
Wallville—Peterson, G. (L.)
Westernpoint—Kalbaugh, A. B. (L.)
Westport—Duff, J. A. (M.)

MASSACHUSETTS

Attleboro—McCaffrey, J. J. (L.)
Boston—Allen, A. W. (C.)
Chaffin, G. L. (L.)
Janney, J. C. (M.)
McQuesten, P. (L.)
Meserve, E. A. (C.)
Rogers, E. A. (C.)
Rumage, W. T. (L.)
Stevens, H. W. (M.)
Wilcox, C. F., Jr. (L.)
Wyman, E. T. (M.)
Brockton—Budreski, A. F. (L.)
Cambridge—Chalfen, S. E. (C.)
Fall River—Blood, G. W. (L.)
Holyoke—Hussey, E. J. (M.)
Lynn—Johnson, H. A. (M.)
Marlboro—Buckley, J. T. (M.)
Swift, H. M. (M.)
Natick—Annis, S. B. (L.)
Newton—Adams, E. A. (L.)
Wilbur, G. B. (L.)
North Adams—Curran, G. L. (C.)
Salem—Haywood, R. W. (L.)
Rushford, E. A. (M.)
Somerville—DeWolf, C. W. (C.)
Springfield—Budington, H. F. (C.)
Gates, E. A. (M.)
Westfield—Cosgrove, J. J. (L.)
Worcester—Denning, W. E. (C.)
Harriman, F. E. (L.)

MICHIGAN

Ann Arbor — Salisbury, W. N. (M.)
Battle Creek—Holes, J. J. (C.)
Calumet—Schroeder, L. P. (L.)
Cass City—McCoy, I. D. (C.)
Detroit—Beattie, R. (M.)
Belyea, J. A. (C.)
Bittker, I. I. (L.)
Bolio, E. W. (C.)
Chapman, A. L. (L.)
Cowen, L. B. (L.)
Gardner, F. F. (L.)
Hall, A. C. (L.)
Hudson, A. W. (C.)
Hull, L. W. (L.)
Mollica, S. G. (L.)
Reed, H. W. (L.)
Runo, H. H. (M.)
Schultz, E. C. (C.)
Stefanski, C. (C.)
Flint—Hackman, H. C. (L.)
Highland Park—Caveney, M. W. (C.)
Hillman—Lister, G. F. (C.)
Kalamazoo—Hoebeke, W. G. (L.)
Mesick—Gruber, J. F. (C.)
Metamora—Johnson, O. G. (C.)
Muskegon—Swartout, W. C. (L.)
Pigeon—Yale, A. E. W. (C.)
Saginaw—Harris, L. B. (C.)
Kollig, M. (C.)
Sample, I. T. (L. C.)
St. Joseph—Crofton, J. F. (L.)
Trenton—Kinyon, H. B. (C.)

MINNESOTA

Bemidji—McCann, D. F. (C.)
Blooming Prairie—Dailey, W. J. (C.)
Jordan—Leonard, L. J. (L.)
Kimball — Leavenworth, R. O. (L.)
Lake Crystal—Franchere, F. W. (L.)
Minneapolis—Connor, C. E. (C.)
Knudtson, H. M. (L.)
Moersch, F. P. (C.)
St. Paul—Abbott, J. S. (C.)
Libert, J. N. (L.)

MISSISSIPPI

Biloxi—Carroll, G. F. (L. C.)
Blue Mountain—Scott, Z. J. (C.)
Jackson—Lewis, W. B. (C.)
Johns—Boykin, S. R. (L.)
Lamkin—Reid, J. S. (C.)
McBride—Harper, R. B. (C.)
Meridian—Leigh, R. M. (C.)
Mount Olive — McIntosh, J. S. (C.)
Oakvale—Denson, G. C. (C.)
Philadelphia — Harrison, C. H. (C.)
Scott—Lane, S. L. (L.)
Vicksburg—Denson, H. C. (C.)

MISSOURI

Ewing—Cole, P. F. (C.)
Kansas City—Davis, C. F. (C.)
Kyner, T. A. (C.)
Rhodes, C. C. (C.)
Salzberg, B. A. (L.)
St. Joseph—Wallace, H. K. (C.)
St. Louis—Barlow, R. L. (L.)
Bechtold, E. (L.)
Beedle, H. B. (C.)
Dahms, G. (L.)
Harris, D. L. (M.)
Harris, I. J. (C.)
Hurford, P. G. (C.)
St. Louis—Kennedy, W. U. (M.)
Levin, S. S. (L.)
McCarty, E. D. (L.)
Mitchell, W. F. (C.)
Peacock, K. C. (L.)
Poos, E. E. (C.)
Rose, D. K. (L.)
Rothman, J. (C.)
Ryan, L. A. (C.)
Windsor—Jennings, R. J. (L.)

MONTANA

Bozeman—Jump, C. F. (M.)
Cascade—McLennan, D. A. (C.)
Great Falls—Irwin, J. H. (M.)
Hamilton—Owens, R. L. (M.)
Livingston—Marquis, T. B. (C.)
Roundup—Lewis, G. A. (L.)
Washoe—Beltzer, C. E. (C.)

NEBRASKA

Axtell—Wells, F. A. (C.)
Lincoln—Spivey, C. D. (C.)
Norfolk—Nelson, L. L. (L.)
Omaha—Barr, A. L. (L.)
Dermody, L. A. (L.)
Stearns, R. J. (L.)

NEVADA

Bauvard—Paradis, H. A. (L.)

NEW HAMPSHIRE

Manchester—Miller, S. (C.)

NEW JERSEY

Bloomfield—Morse, G. V. (C.)
Camden—Meyer, G. P. (C.)
Chrome—Mark, J. S. (L.)
Englewood—Teeter, J. N. (M.)
Greystone Park—Young, F. C. (C.)
Jersey City—Fardelmann, A. V. (C.)
Newman, A. J. (C.)
Leonia—Edwards, J. B. (M.)
Wycoff, J. T. (L. C.)
Mont Clair—Cox, W. W. (L.)
Holland, J. A. (C.)
Moorestown — Wintersteen, J. B. (C.)
Newark—Berardinelli, C. G. (M.)
Blackburne, G. (M.)
English, J. T. (C.)
Newson, J. S. (C.)
Paul, F. M. (M.)
Orange—Moffat, B. W. (C.)
Paterson—Bohl, L. I. (L.)
Dwyer, W. A. (C.)
Mitchell, C. R. (C.)
Sarla, M. (L.)
Rahway—Sell, F. W. (C.)
Secaucus—Stewart, R. F. (L.)
Trenton—Kirkpatrick, M. B. (L.)
Treiber, B. A. (L.)
Tuckahoe—Knowles, J. S. (C.)
Wyckoff—Walker, H. G. (C.)

NEW MEXICO

Hurley—Kindall, C. E. (L.)
Laplata—Weber, W. C. (L.)

NEW YORK

Albany—Chapman, B. E. (C.)
Freund, E. M. (C.)
Amityville—Johnson, E. S. (C.)
Ballston Spa—Deming, R. M. (C.)
Brooklyn—Beck, A. W. (L.)
Blaber, M. P. (C.)
Bonvicino, L. A. (L.)
Cauble, W. C. (C.)
Currin, F. W. (L.)
Lefkowitsh, H. M. (C.)
Linden, M. H. (C.)
Looram, J. F. X. (L.)
Mathews, L. B. (L.)
O'Connor, A. J. (L.)
Rohr, L. M. (L.)
Sambur, S. J. (C.)
Schultz, A. (L.)
Shockley, F. M. (C.)
Volk, L. D. (L.)
Wilson, E. E. (C.)
Zuckerman, W. (L.)
Buffalo—Schaefer, A. C. (M.)
Trudnowski, J. F. (L.)
Wright, T. (L. C.)
Castleton—Timmers, G. W. (M.)
Clifton Springs — Wentworth, J. A. (L.)
Corning—McNamara, T. L. (L.)
Crescent—Grunewald, W. R. (C.)
Elmira—Voorhees, B. G. (C.)
Zimmerman, C. G. (L.)
Fort Plain—Fox, W. C. (C.)
Fredonia—Trippe, F. A. (L.)
Genesee—Toole, C. D. (L.)
Gloversville—McKillip, B. G. (C.)
Wheaton, H. W. (L.)
Haverstraw—Gibb, W. B. (C.)
Ilion—Johnson, W. K. (C.)
Ithaca—Utzinger, O. E. (C.)
Jamestown—Goodwin, F. P. (M.)
Illston, B. F. (C.)
Johnstown — Neuendorf, F. M. (C.)
Lackawanna—Smith, K. A. (L.)
Leicaster—Fiero, C. M. (C.)
Mechanicsville—Green, G. A. (C.)
Middletown—Moody, R. W. (L.)
Morrisville—Dare, G. D. (C.)
New York — Alexander, H. L. (M.)
Austin, D. L. (L.)
Bacharach, D. (C.)
Banta, E. W. (C.)
Blakeslee, G. A. (M.)
Bridgman, T. F. (C.)
Brod, B. (L.)
Davin, E. J. (C.)
Decker, J. W. (C.)
Fetzer, F. W. (L.)
Fleming, W. V. (L.)
Hannon, W. C. (L.)
Herzfeld, M. G. (M.)
Horwitz, J. (C.)
Judge, T. F. (L.)
Kahn, I. W. (L.)
Keyes, J. M. (C.)
Kortright, W. P. (L.)
Kramer, D. (M.)
Larsen, N. P. (M.)
Leavy, I. M. (L.)
Lubarsky, D. A. (L.)
Montgomery, F. E. (L.)
Morison, R. A. (C.)
Natanson, D. M. (L.)
Orr, F. B. (L.)
Paleg, S. (L.)
Pascale, V. (C.)
Pinkham, E. W. (Col.)
Reitzfeld, I. (C.)
Siebeneichen, H. A. (L.)
Smith, E. W. (L.)
Smith, J. V. (C.)
Stevens, N. C. (C.)
Thacherd, H. C. (M.)
Niagara Falls—Hutter, H. J. (C.)
Otto—Campbell, H. S. (C.)
Richmondville—Low, W. E., Jr. (C.)
Rochester—Atwater, D. H. (C.)
Barnard, M. A. (L.)
Sachs, J. (C.)
Ruyter—Woglom, W. W. (L.)
Schenectady—Holt, R. G. (C.)
Staten Island—Rimer, E. S. (M.)
Sterner, B. L. (L.)
Utica—Lyman, H. C. (C.)
Warwick—Bradner, M. R. (C.)
Krug, B. M. (L.)
White Plains—Purdy, S. (M.)
Willard—McNeill, J. F. (L.)
Woodhaven—Schneble, J. P. (C.)
Yonkers—Katz, M. (C.)

NORTH CAROLINA

Chapel Hill—Bullitt, J. B. (M.)
Charlotte—King, P. M. (C.)
Conetoe—Williams, T. G. (L.)
Greensboro—Ashby, E. C. (C.)
Hillsboro—Hayes, R. B. (C.)
Raleigh—Ray, H. (L.)
Rocky Mount—McCall, A. C. (C.)
Sanatorium—Thompson, S. W., Jr. (C.)
Silver City—Wrenn, F. R. (C.)

NORTH DAKOTA

Bismarck—Arnson, J. O. (C.)
Epping—Wheelock, D. O. (L.)
Rolla—Verret, B. D. (L.)

OHIO

Akron—Reichelderfer, V. D. (C.)
Amanda—Hosler, R. S. (L.)
Arcanum—Smith, W. J. (C.)
Bellefontaine—McCracken, A. J. (C.)
Pratt, R B. (L. C.)
Bellevue—Harding, C. L. (C.)
Bowling Green—Bolles, J. R. (C.)
Byesville—Danford, V. H. (C.)
Cambridge—Lane, F. W. (M.)
Celina—Ayers, F. E. (L.)
Chillicothe—Holmes, R. W. (M.)
Cincinnati—Foertmeyer, A. W. (C.)
Heizer, L. W. (C.)
Heyn, D. S. (C.)
McGrath, E. R. (L.)
Peterson, M. L. (M)
Steinharter, E. C. (L.)
Topmoeller, W. J. (C.)
West, A. L. (L.)
Zielonka, S. (C.)
Cleveland—Aland, A. H. (L.)
Feil, H. (L.)
Fliedner, G. B. (C.)
McClelland, J. E. (C.)
Osmann, L. N. (C.)
Rees, D. L. (L.)
Savage, H. J. (L.)
Columbus—Dunn, J. M. (C.)
Edelman, S. D. (L.)
Fletcher, F. (L. C.)

Columbus—Meek, G. T. (C.)
Nichols, J. H. (L.)
Winders, F. (L. C.)
Wood, E. C. (L.)
Conneaut—Leet, W. H. (L. C.)
Crestline—Harris, R. R. (C.)
Elyria—Metcalf, H. M. (L.)
Galion—Helfrich, M. L. (C.)
Geneva—Austin, H. J. (L.)
Gettysburg—VanLue, J. W. (L.)
Greenfield—Varney, J. D. (M.)
Hamilton—Smedley, C. D. (M.)
Jewell—Stephan, J. E. (L.)
Lima—Jones, A. L. (C.)
Weadock, E. G. (L.)
Metamora—Heffron, C. H. (L.)
Milford—Kennedy, E. J. (C.)
Terwilligar, C. B. (C.)
Minerva—Casey, L. E. (M.)
New Philadelphia — Shauwecker, K. E. (M.)
Painesville—Barnett, G. F. (L.)
Selden—Nisley, G. (L.)
Steubenville—Montgomery, J. R. (C.)
Warren—Hoover, D. E. (M.)
Washington C. H.—Howell, L. P. (C.)
West Union—Ellison, S. J. (C.)
Youngstown—Mariner, J. S. (C.)
Smeltzer, D. H. (C.)
Thomas, E. R. (C.)

OKLAHOMA

Billings—Renfrow, T. F. (C.)
Bristow—Nabhan, J. J. (C.)
Enid—Aitken, W. A. (M.)
Faxon—Chumley, C. P. (L.)
Muskogee—Fite, W. P. (C.)
Nesbitt, P. P. (M.)
Norman—Day, J. L. (M.)
Oklahoma City—Sapper, H. V. L. (C.)
Sparks—Brown, F. C. (L.)
Stigler—Sims, H. J. L. (L.)

OREGON

Eugene—Zimmerman, E. L. (L.)
Forest Grove—Bates, H. E. (C.)
Gold Beach—Robbins, C. W. (L.)
Portland—Grant, D. (C.)
McColl, C. R. (C.)
Weston—Smith, C. H. (C.)

PENNSYLVANIA

Altoona—Bohn, D. (C.)
Archbald—Kearney, J. V. (C.)
McDonnell, P. J. (M.)
Barnesboro—Garman, H. F. (C.)
Bedford—Ayres, W. (C.)
Butler—Hughes, E. M. (L.)
Catasauqua—Kemp, M. (L.)
Charleroi—Repman, H. J. (M.)
Chester—Kilduffe, R. A. (M.)
Colwyn—Long, C. S. (C.)
Danville—Hammers, J. S. (L. C.)
Defiance—McCabe, S. T. (L.)
Dorranceton—Rumbaugh, M. C. (C.)
Elmora—King, C. E. (C.)
Falls Creek — McConnell, A. B. (C).
Fountain Springs—Biddle, R. M. (L.)
Frackville—Donohue, J. J. (C.)
Grays Landing—Brady, H. (C.)
Harlansburg — Cleland, W. D. (M.)
Harrisburg—Yoffe, R. (C.)
Homer City—Kirk, C. H. (C.)
Homewood—McCullough, T. L. (C.)
Kennett Square—Bickell, U. G. (L.)
Kulpsville—Scholl, H. N. (L.)
Latrobe—Schall, L. A. (L.)
Lebanon—Strickler, A. D. (C.)
Monongahela—Bailey, H. F. (C.)
Norristown—Blair, W. A. (C.)
Philadelphia—Asnis, E. J. (M.)
Bartley, J. H., Jr. (L.)
Codman, C. A. E. (L. C.)
Cohen, M. S. (C)
Davidson, H. S. (L.)
Davis, R. S. (M.)
Felderman, L. (C.)
Frazier, C. H. (L. C.)
Ginsburg, G. (L.)
Hagedorn, H. M. (L.)
Haig, C. R., Jr. (L.)
Horger, U. P. (C.)
Johnson, W. C. (L)
Krauss, W. R. (L)
Leedom, J. (C.)
Livingstone, W. R. (L.)
McGinnis, G. E. (M.)
McMillan, T. M., Jr. (L.)
Meriwether, J. A., Jr. (L.)
Mikelberg, H. B. (L.)
Moore, A. H. (C.)
Perkins, W. H. (L.)
Poulson, W. C. (C.)
Philadelphia—Ramsey, W. G. (C.)
Robinson, B. (C.)
Stubbs, F. G. (L.)
Tait, C. H. (L. C.)
Tyson, R. M. (C.)
Van Korb, W. (C.)
Voegelin, A. E. (L.)
Wiley, L. R. (C.)
Wolfe, J. B. (C.)
Pittsburgh—Askin, R. J. (L.)
Chaffee, B. S. (C.)
Crawford, J. S. (C.)
Duff, A. W. (M.)
Gannon, N. D. (L.)
Grayson, T. W. (M.)
Holland, H. A. (L.)
Ingram, C. H. (M.)
Johnston, G. C. (Col.)
Landon, L. H. (M.)
Magoffin, M. B. (L.)
McConnell, W. J. (C.)
Ochsenhirt, N. C. (L.)
Sosnowski, J. J., Jr. (L.)
Point Marion—Devlin, C. J. (L.)
Pottsville—Heller, J. B. (L.)
Quarryville—Signor, D. (M.)
Scranton—Lonsdorf, J. J., Jr. (C.)
Smigelsky, I. E. (L.)
Smethport—Hamilton, R. (M.)
Sunbury—Schoffstall, J. W. (C.)
Uniontown—Griffin, G. H. (L.)
Wilkes Barre—Jacobsky, C. (C.)
Kalmutz, G. G. (C.)
Mundy, L. C. (M.)

RHODE ISLAND

Howard—Gagnon, A. J. (L.)
Providence—Dwineil, W. G. (M.)
Hamilton, J., Jr. (M.)
Pitts, H. C. (M.)

SOUTH CAROLINA

Columbia—Durham, R. B. (C.)
Watson, J. J. (C.)
Gaffney—Ferguson, R. T. (M.)
Honea Path—Knight, J. P. (L.)
Latta—Major, E. C. (M.)
Nesmith—Willcox, A. M. (L.)
Sumter—Burgess, W. S. (C.)
Townville—Webb, J. N. (C.)
Williston—Blanchard, A. S. (L.)

SOUTH DAKOTA

Buffalo—Raber, D. D. (C.)
Carter—Malster, R. M. (C.)
Sisseton—Longstreth, W. I. (C.)

TENNESSEE

Bristol—Newland, L. W. (C.)
Carter—Ensor, D. B. (L.)
Chattanooga—Hubbard, S. T. (C.)
Means, R. M. (C.)
Darden—Maxwell, E. G. (C.)
Dresden—Walker, S. E. (L.)
Lexington—Parker, S. T. (L.)
Memphis—Morgan, J. L. (M.)
Sanders, R. L. (M.)
Spnigarn, M. G. (C.)
Morristown—Howell, W. E. (C.)
Nashville—Anderson, C. F. (M.)
Springfield—Lee, F. W. (C.)
Tullahoma—Griffith, C. M. (C.)

TEXAS

Bryan—Sims, B. U. (C.)
Burton—Hodde, F. H. (L.)
Claude—Warner, W. A. (L.)
Cleburne—Yater, R. E. L. (C.)
Gainesville—Warren, C. H. (L.)
Galveston—Fisher, W. C., Jr. (C.)
Hillsboro—Anderson, K. A. (C.)
Houston—Cody, C. C., Jr. (M.)
Robstown—Carter, N. D. (C.)
San Antonio—Haggard, F. N. (L.)
Wilson, H. T. (M.)
Shiro—Franclow, C. D. (L.)
Tencha—Martindale, A. H. (L.)
Three Rivers—Neal, W. S. (C.)
Waco—Connally, H. F. (L. C.)

UTAH

Roosevelt—Browning, W. J. (C.)
Salt Lake City — Kirtley, H. P. (M.)
Scott, H. S. (C.)

VERMONT

Bennington—Houle, A. E. (C.)
Burlington—Courtney, J. W. (C.)
Grafton—Gilbert, F. L. (M.)
Hardwick—Rublee, G. C. (L.)
Montpelier—Carey, M. D. (L.)
Northfield—Hurley, W. H. (L.)
Springfield—Lawrence, H. H. (L.)

VIRGINIA

Mattoax—Burton, L. C. (L.)
Richmond—Coffman, M. B. (C.)
Coleman, C. C. (M.)
Cook, G. B. (M.)
Fitts, J. B. (L.)
Roanoke—Folkes, C. A. (L.)

WASHINGTON

Dayton—Brunjes, D. G. (C.)
Kirkland—McKibben, E. C. (C.)
Leavenworth—McKeown, A. R. (L.)
North Yakima — Boone, W. H. (L.)
Skinner, H. H. (L.)
Seattle—Coffin, S. D. (C.)
Simpson, A. U. (M.)
Spokane—O'Shea, W. M. (C.)
Sprowl, F. G. (M.)
Tacoma—DeMartini, S. A. (C.)
Twisp—Couche, J. B. (L.)

WEST VIRGINIA

Blandville—O'Brien, J., Jr. (L.)
Cameron—Sammons, W. P. (L.)
Charleston—Gordon, P. L. (C.)
Huntington—Keatley, H. W. (C.)
Pence Springs—Pence, G. L. (C.)
Princeton—Hays, H. C. (C.)

WISCONSIN

Ashland—Sincock, H. A. (L.)
Blair—Kelly, C. D. (C.)
Clinton—Dodge, C. H. (L.)
Fond du Lac—Longley, J. R. (M.)
Janesville—Clarke, C. P. (M.)
Lone Rock—Eagan, R. L. (L.)
Madison—Blanton, S. (C.)
Milwaukee—Hogue, G. I. (L. C.)
Klein, J. T. (L.)
Oconto—Linger, E. A. (L.)
Oshkosh—Lockhart, J. W. (C.)
Prairie du Chien—Scanlan, P. L. (C.)
Racine—Johnston, W. W. (M.)
Rib Lake—Lapham, E. A. (C.)
Stoughton—Keenan, H. A. (C.)
Waukesha—Carberry, E. A. (C.)

WYOMING

Kaycee—Mitchell, L. E. (L.)

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ARKANSAS

Held as Narcotic Law Violator.—Dr. S. F. Walker, Texarkana, is said to have been arrested on a federal warrant charging violation of the narcotic law, and after a hearing before the United States commissioner is said to have been held for the grand jury in bonds of $2,000.

Medical Board Reorganized.—At the annual meeting of the state medical board for reorganization, at Little Rock, Dr. Julius A. Bogart, Forrest City, was elected president, and Dr. Thomas J. Stout, Brinkley, and Edward F. Ellis, Fayetteville, were reelected secretary and treasurer, respectively.——Dr. William H. Toland, Nashville, has been appointed a member of the state medical board, suceeding Dr. Francis J. Isbell, Horatio.

Personal.—Dr. Lemuel E. Willis, Newport, is reported to be seriously ill at his home.——Dr. Henry H. Atkinson, Fordyce, has succeeded Dr. Claiborne J. March, Fordyce, resigned, as health officer of Dallas County.——Dr. Charles S. Holt, Fort Smith, has been appointed division surgeon of the Missouri Pacific system with headquarters at Fort Smith. ——Dr. P. P. Boggan, Forrest City, has been reappointed health officer of St. Francis County.

ILLINOIS

New Hospital.—A new maternity hospital is to be built in Chicago, at Forty-Seventh and Mozart Streets, by Archbishop Mundelein. It will be known as Misericordia Maternity Hospital and will house 100 mothers and 150 infants. The initial expense of the institution will exceed $100,000.

Base Hospital Officers Organize.—August 19, twenty-six officers of Northwestern University Base Hospital No. 12, held a meeting in Chicago to form a peace-time organization to hold together the personnel of the unit which achieved such notable success in France. Payson L. Nussbaum, Major, M. C., U. S. Army, was elected president; Kellogg Speed, Lieut.-Col., M. C., U. S. Army, vice president, and Stanley W. Clark, Capt., M. C., U S. Army, secretary-treasurer, all of Chicago.

Paris-Chicago Hospital Foundation.—The Paris-Chicago Hospital Foundation has been incorporated in Illinois with offices in the Marquette Building, Chicago. The officers and directors of the association are: president, Dr. Charles H. Johnson; vice presidents, Dr. Truman W. Brophy and Mrs. E. C. Thomas; secretary, Mrs. Milan H. Hulbert, and treasurer, Mrs. Archibald Freer, and the medical members of the board of directors are: Drs. Edmund J. Doering, William H. Wilder, Thomas J. Watkins and Lewis L. McArthur.

Personal.—Dr. Alice Barlow Brown, Winnetka, has returned after twenty-two months' service in France.——Dr. Antony Biankini, Chicago, one of the founders of the Jugo-Slav National League of America and president of the league for several years, has been decorated by the Jugo-Slav government with the Order of St. Sava.——Dr. John A. Kappelman, Chicago, has been appointed full-time health officer of

Canton with a yearly salary of $3,300.——George G. Davis, Lieut.-Col., M. C., U. S. Army, Chicago, arrived in New York from France on the *Northern Pacific*, August 12.——Dr. Gertrude Moulton, Urbana, has been appointed assistant health officer and advisory physician for women students at the University of Illinois, Urbana.

IOWA

Physician Held to Grand Jury.—Dr. John W. Conaway, Hartley, charged with performing a criminal operation, which resulted in the death of a woman in Spencer, July 27, was held to the O'Brien County grand jury at bonds fixed at $5,000.

Personal.—Dr. Louis Baumann, formerly director of research and assistant professor of medicine in the State University of Iowa, Iowa City, has been appointed associate in medicine at Columbia University and assistant visiting physician at the Presbyterian Hospital, New York City.——Dr. Henry Schumacher, Walcott, sustained a serious stab wound of the leg in a quarrel, August 19.——Dr. William J. McDonald, recently Major, M. C., U. S. Army, sanitary inspector of the Thirty-Fifth Division, has been placed in charge of the students' health service at the state university, Iowa City.——Dr. Herman Fischer, Burlington, chief medical examiner of the Burlington system, with headquarters at West Burlington, has resigned to resume private practice, and has been succeeded by Dr. A. D. George, formerly examiner for the company at Lincoln, Neb.——Dr. John C. Newlon, Exira, is reported to be seriously ill.——Dr. George F. Severs, Centerville, has been elected president of the state board of health, suceeding Dr. Walter L. Bierring, Des Moines.——Dr. Jeannette F. Throckmorton, Chariton, has begun work in Des Moines under the supervision of Dr. Wilbur F. Conkling, recently appointed director for venereal disease work in Iowa.——Dr. Charles F. Noe, Amana, and Dr. Gershom H. Hill, Des Moines, have been elected members of the board of curators of the state historical society.

KENTUCKY

New Hospital.—Drs. Amerida M. Gross and Robert L. Collins have purchased a residence at Hazard and are remodeling it for use as a hospital.

Chiropractors Arrested.—The state board of health, June 30, arrested six chiropractors and naturopractors on charges of practicing medicine without a license. The six are: C. B. Sutherland, J. T. Finch, W. T. Ausbrook, W. H. Dunn, A. Losey and H. C. Pirtle.

Clinic Holding Company Incorporates.—The Clinic Holding Company, Lexington, filed articles of incorporation with the Fayette County clerk, August 12. The corporation has a capitalization of $100,000 and is empowered to hold real estate and personal property for the purposes of holding clinics, and to carry on a general practice. The incorporators are Drs. David Barrow, Waller O. Bullock, Ernest B. Bradley, Julian T. McClymonds, Charles C. Carr, Frank H. Clarke, William T. Briggs, Walter S. Wyatt and D. Woolfolk Barrow, all of Lexington.

LOUISIANA

Camp Hygeia Title Transferred.—The Orleans Anti-Tuberculosis League has acquired the title to Camp Hygeia in St. Tammany Parish, and the charter for the league has been issued.

Hospital Completed.—Emory Hospital, New Orleans, has been completed by the Southern Pacific Railway for the first-aid treatment of its employees. It is located at Atlantic Avenue and Evelina Street.

Appeal for Funds for Lepers.—A committee has recently been formed in New Orleans to secure $5,000 for an amusement fund for 150 men and women who are inmates of the Louisiana Lepers' Home, Carville.

MARYLAND

Plans to Combat Influenza.—The Baltimore City Health Department is making preparations and taking every precaution to combat an influenza epidemic, should there be a recrudescence of the malady this fall.

Drug Clinic Opened.—A clinic for drug addicts of Baltimore has been put into operation at the headquarters of the Volunteers of America by Captain Loga, in cooperation with the city health department and the internal revenue bureau. More than 300 patients can be cared for by the clinic, which already has three physicians in attendance, with the expectation of a fourth. It is estimated that there are not 300 genuine addicts of the habit in Baltimore, at least not that many who are too far gripped by the habit to take care of themselves.

MASSACHUSETTS

Semicentennial of State Health Department.—The Massachusetts State Health Department will celebrate its semicentennial at the State House, Boston, September 15, under the auspices of the Massachusetts Medical Society, and the associated boards of health and the state health department.

Third School for Feebleminded Provided.—The legislature of 1919 appropriated $250,000 for the Belchertown School for Feebleminded. The present farm colony is being enlarged and a railroad spur is being laid to the plant. The appropriation will provide for the erection of a store house, bakery, laundry, power house and custodial building for 140 inmates, a dormitory for 105 and the necessary building and road constructions.

Administrative Functions Reorganized.—In accordance with the provision of the revised state constitution the functions of the department of public health are set forth as follows: "The Department of Public Health shall consist of the State Department of Health and include a division of sanitoria, with the power of the board of trustees of the hospitals for consumptives, which is abolished. Penikese Hospital shall also be in this division."——The department of mental diseases includes the commission on mental diseases and the control and supervision of the Norfolk State Hospital.

Personal.—Frederick T. Clark, Westfield, Capt., M. C., U. S. Army, chief of the ophthalmic service at U. S. Army General Hospital No. 1, New York City, has been promoted to the rank of major, M. C., and been made chief of the combined ophthalmic and otolaryngologic service in that hospital.——The increase in the salaries of medical examiners (coroners) Leary and McGrath, Boston, from $4,000 a year to $5,000 a year was approved by Mayor Peters, August 5.——The active work of Dr. Dudley A. Sargent, Cambridge, as director of the gymnasium at Harvard, has closed with the completion of forty years of service in that capacity. No successor has as yet been appointed.——Dr. S. Burt Wolbach, Boston, has returned from Mexico where he spent more than a month in study and research work as to the cause of typhus fever.——Dr. Loring B. Packard has resigned as superintendent of the Brockton Hospital on account of ill health.

MISSOURI

Advisory Board Appointed.—Dr. Thomas B. M. Craig, superintendent of State Hospital No. 3, Nevada, has selected a number of physicians throughout the state to act as an advisory board of the hospital and the plans have received the approval of the board of managers. This is believed to be the first time the superintendent of a state hospital has created a board for the purpose of cooperating with the superintendent in an advisory capacity.

Society Establishes Clinical Section.—About 100 members of the St. Louis Medical Society have established a clinical section of the society and have organized the clinical material available for graduate instruction. There will be clinics in general surgery and medicine as well as in the various special branches so that visiting physicians will have an opportunity to obtain graduate instruction not hitherto open to them in St. Louis. It is announced that these clinics will be ready, October 1.

Personal.—Dr. Emmett S. Ballard, St. Joseph, has been elected a member of the school board to succeed Mr. S. I. Motter, resigned, and Dr. Hasbrouck DeLamater has been reelected director of hygiene in the schools of St. Joseph.——Dr. Borden S. Veeder, St. Louis, has received from Great Britain the decoration of Companion of the Order of St. Michael and St. George.——Dr. Dudley S. Conley has been appointed to succeed Dr. Max Meyer in the medical faculty of the State University, medical department, Kansas City.

NEW YORK

Red Cross Workers Honored by Serbia.—According to a recent report from Belgrade, Red Cross workers from nine cities in New York have been decorated by Prince Alexandria of Serbia. Among this number are Major F. L. Emerson of New York and Dr. Regina F. Keyes of Buffalo who received the Order of the White Eagle. Dr. Francis M. Flood of Elmira received the Order of St. Sava.

New York City

Deaths from Wood Alcohol.—Within two days three deaths from wood alcohol were reported from a locality in the Bronx. Following these fatalities Nathan Allowitz and his wife were arrested and held in $20,000 bail for selling wood alcohol. They were found to be in possession of 13 gallons of a liquid which the health department stated was wood alcohol.

Personal.—Dr. S. Josephine Baker, director of the bureau of child hygiene, was recently appointed a member of the advisory committee for the Federal Children's Bureau at Washington, and as such has been designated special agent of the children's bureau in New York City.——Dr. Lucius P. Brown, director of the bureau of food and drugs of the department of health, has been honorably discharged from the service and has resumed his duties with the health department.

New Health Department Building.—Health Commissioner Royal S. Copeland announced, August 19, the tentative approval of a plan for a twelve-story, health headquarters' building on Thirtieth Street, between Sixth and Seventh avenues, to cost $1,000,000. The building will occupy a site already belonging to the city. Three or four floors will be given up to laboratories. There will be an auditorium, clinic rooms, model health stations, room for vaccinations, records, etc.

Jacobi Memorial Plans Expanded.—Some time ago it was announced that in the fall a campaign would be carried on to raise funds for a hospital in the Washington Heights section of New York as a memorial to Dr. Abraham Jacobi. These plans have been developed in a somewhat different way and it is now announced that appeals will be sent to 140,000 physicians in the United States for contributions to a $1,000,000 fund, a large part of which will be devoted to the endowment of the institution after it is built. It is now stated that the memorial will be for children only and will probably be erected as an annex to the Jewish Memorial Hospital. The institution will be nonsectarian in character and an endeavor will be made to endow as many free beds in the hospital as possible as a tribute to Dr. Jacobi's labors among the poor of the city.

NORTH CAROLINA

Library for Medical Society.—A medical library to contain the latest medical works and periodicals is planned by the Mecklenburg County Medical Society, the members of which have already subscribed $1,000 toward building up the present medical society library at Charlotte.

Venereal Disease Clinics Established.—The eighth clinic for the treatment of venereal disease in North Carolina has been established at Clinton, and is under the charge of Dr. Eddie T. Collingsworth. Other clinics are now in operation at Charlotte, Rocky Mount, Wilmington, Fayetteville, Asheville and Winston-Salem, and it is expected a clinic will be opened at Greensboro in a short time.

Hospital Notes.—At the meeting of the Gaston County Medical Society, August 6, efforts looking toward the erection of a municipally owned hospital for Gastonia, Gaston County, were unanimously endorsed.——Laurel Hospital at White Rock, Madison County, was recently completed and will be under the charge of Dr. George H. Packard.——Drs. Kinchin C. Moore, Henry B. Best, Ernest S. Strickland and P. P. Lane are interested in the organization of a hospital for Wilson with a forty-bed capacity and to cost $50,000. ——Work has been started on an addition to the Appalachian Hall Sanatorium, Asheville, to cost $15,000.

Personal.—Dr. Wilbur A. McPhaul, Lumberton, who has been health officer of Robeson County for two years, has resigned to accept the position of director of rural sanitation of the state of Alabama.——Drs. Frederick M. Hanes and Thomas W. Davis, Winston-Salem, have been elected members of the Winston-Salem City Hospital Commission. ——Drs. Richard H. Lewis, Raleigh, and E. J. Tucker, Roxboro, have been appointed members of the state board of health to fill vacancies.——Dr. C. Curtis Hudson, city health officer of Charlotte, has been appointed chairman of the section of public health of the Medical Society of the State of North Carolina.

OHIO

Personal.—Dr. Clifton F. McClintic, assistant dean of the medical department of the University of Cincinnati, has resigned. His resignation will take effect, September 1. He has accepted a position in the Detroit College of Medicine and Surgery.——Dr. Jonathan Forman, Austinburg, has resigned as assistant professor of pathology in the Ohio State University.——Dr. George Huntley, Oberlin, for thirty years a medical missionary of Shanghai, China, has returned on leave of absence of a year.

Trachoma Campaign.—The state department of health has opened a campaign to rid Ohio of trachoma which is especially prevalent in the counties bordering on the Ohio River, where the disease is believed to have been spread from the mountain districts of Kentucky and West Virginia. An intensive campaign is to begin at once in Scioto County. The state authorities will be aided by trachoma experts from the United States Public Health Service. Every schoolchild in the county will be examined as soon as school opens and free clinics for persons unable to pay for the necessary medical treatment will be established in September.

Training Course for Hospital Executives.—A division of hospital administration will be added to the department of industrial medicine and public health of the Medical College of the University of Cincinnati. Instruction will begin with the opening of the fall semester of the medical college, and will consist of twelve months of didactic and practical training. The work will be so arranged as to provide for practical instruction in the various cooperating hospitals of the Cincinnati district during the morning hours. The afternoon hours will be devoted to didactic lectures, round table conferences, quizzes, discussions and survey trips in groups. The courses of instruction will not be confined to physicians, but will be available to all persons whose individual qualifications are approved by the director, and whose preliminary education will permit them to matriculate in the university. Certificates will be awarded to students satisfactorily completing the prescribed courses, which will indicate the nature and extent of the work pursued.

OKLAHOMA

Health Conference.—The second annual Oklahoma State Public Health Conference will be held in Oklahoma City, September 23 and 24, under the auspices of the Oklahoma Tuberculosis Association and the state department of health.

State Board Elections.—At the meeting for organization of the state board of medical examiners, July 10, H. C. Montague, Muskogee, was elected president; Dr. Lewis E. Emanuel, Chickasha, vice president; Dr. James M. Byrum, Shawnee, secretary, and Daniel W. Miller, Blackwell, treasurer.

Field Secretary Employed.—The Oklahoma Tuberculosis Association has employed a medical field secretary, whose duty will be to tour the state, advise other physicians on modern methods of diagnosis and treatment of tuberculosis and also to conduct clinics in various cities of the state.

PENNSYLVANIA

Enlarge Insane Hospital.—The board of trustees of the Homeopathic Hospital for the Insane at Rittersville awarded contracts for the construction of four new buildings, including a home for women nurses, a nurses' dining room, sleeping quarters for employees and a double farm house. The total cost will be more than $75,000.

Personal.—Dr. James R. Montgomery, Bloomsburg, has been appointed county medical officer by the state department of health, succeeding Dr. Samuel B. Arment.——Dr. William L. Estes has been appointed chief of the Genito-Urinary Dispensary of South Bethlehem by Commissioner of Health Edward Martin.——Dr. Lloyd McCarthy, Altoona, announces his retirement from practice.

Conference of Industrial Physicians.—The ninth conference of Industrial Physicians and Surgeons of the State Department of Labor and Industry will be held at the State Capitol, Harrisburg, September 22, in cooperation with the annual session of the Medical Society of the State of Pennsylvania. The program includes a symposium on health insurance, and papers dealing with the workmen's compensation act, and the sanitary disposal of sewage and trade wastes.

Philadelphia

Personal.—Dr. Samuel T. Orton of the University of Pennsylvania Hospital has been secured as head of the new psychopathic hospital at Iowa City, which is being erected at a cost of $150,000.——Dr. Matthew F. Czubak has been elected surgeon-general of the Foreign War Veterans.—— Dr. Arthur Dare, Lieut.-Col., M. C., U. S. Army, has returned home after several months' service abroad.

Hospital Seeks Fund.—A drive to obtain $50,000 for the Frederick Douglass Memorial Hospital began, August 20. So far, more than $800 has been collected. The bill awarding the annual state appropriation of $22,000 to the institution provided that if the board of managers of the hospital refused to dismiss Dr. Nathan F. Mossell, as head of the hospital, the appropriation should not be granted.

SOUTH CAROLINA

Personal.—Frank D. Mower, Major, M. C., S. C. N. G., Newberry, has been appointed a member of the staff of Governor Cooper, with the rank of lieutenant-colonel.——Dr. James A. Hayne, Columbia, state health officer, who has been ill in a hospital in Washington for several weeks, returned to his home, July 7, convalescent.

Hospital News.—A commission was issued, July 25, to the Edgefield Hospital which has a capital stock of $50,000. The incorporators are Drs. Albert R. Nicholson, Robert A. Marsh, Edgefield, and John N. Crafton, Colliers.——Excavation was commenced, July 21, for the new Spartanburg Hospital on North Church Street. The building will be four stories with basement in height, fireproof, and will cost about $200,000. The new hospital will absorb the Good Samaritan Hospital and Spartanburg Hospital, and it is expected the building will be ready for occupancy Jan. 1, 1920.——A hospital building is being erected at Chesnee, by Dr. Joseph B. Cash, at a cost of about $30,000. The hospital will have six wards and twenty-seven rooms, and it is expected that it will be ready to receive patients by November 1.——The annex of the Piedmont City Hospital will be ready for occupancy about the middle of September.——The campaign for the first unit of the Palmetto Sanitarium for Negroes, Columbia, was terminated, July 10, when a sum of $6,000 raised by negroes of the state was presented to the state board of health. A sum of $10,000 was provided by the last legislature for the purpose of providing a sanatorium for negroes of the state. ——The Steedly Clinic and Sanitarium, at Chick Springs, was formally opened, July 10. The instiutnion is under the care of Dr. Benjamin B. Steedly, Spartanburg.

SOUTH DAKOTA

Work on Asylum Site Begun.—Work on the improvement of the site for the Northern Hospital for the Insane, located just south of Watertown, has been commenced.

New Hospital.—The state board of charities and corrections has purchased 153 acres of land between the State Hospital and the city of Yankton, for the use of the hospital.—— It has been decided to erect a hospital in Beresford to cost between $60,000 and $65,000.——Work has been started on a new hospital building at Sisseton, which will be under the charge of Dr. John W. Powell, and will provide quarters for fifteen patients.——Articles have been filed by Dr. Robert S. Westaby, J. A. Johnson and R. W. Rooney for a new hospital at Madison with a capital of $100,000.

WASHINGTON

Personal.—William L. McClure, Lieut.-Col., M. C., U. S. Army, North Yakima, has returned after two and a quarter years' service abroad.

Tuberculosis Clinic to Open.—It is announced that the Spokane County Tuberculosis Clinic will be opened by September 1, with headquarters in Spokane.

State Society Meeting.—The Washington State Medical Association will hold its annual meeting in Spokane, September 11 to 13, under the presidency of Dr. Herman P. Marshall, Spokane.

Smallpox.—For the first six months in 1919, smallpox headed the list of communicable diseases in Washington, with 2,138 cases; mumps followed with 2,076; chickenpox, with 1,585; scarlet fever, with 1,464, and measles, with, 1,396.

Building for Medical Men.—The Medical Building Company was recently incorporated at Seattle, with the following officers: president, Edward B. Frick; vice president, Dr. Philip V. von Phul; secretary-treasurer, William E. Robinson, and trustees, J. W. Sharpless and Dr. Homer D. Dudley, Seattle. The object of the organization is to build a modern office building for the exclusive use of physicians and dentists.

Medical and Safety Board Meeting.—The oath of office was administered, July 8, at Olympia, to members of the state medical and safety board. The state medical board is composed of Drs. John W. Mowell, Olympia, and J. S. Kloeber, and Mr. Martin Flyzik, and the advisory members are State Labor Commissioner C. H. Younger, and State Mine Inspector Bagley. The board has appointed Mr. John W. Pace as secretary and statistician.

GENERAL

Army Dental Surgeons Meet.—At the annual meeting of the Association of Military Dental Surgeons, Dr. E. P. R. Ryan was elected president; Dr. J. L. Brown, vice president; Dr. R. W. Waddell, secretary-treasurer, and Dr. William C. Fisher, editor.

Public Health Service Issues Pamphlet on Cancer.—The United States Public Health Service has just issued bulletins entitled "Cancer Facts which Every Adult Should Know." It is a 32-page pocket size pamphlet, giving the main facts regarding the prevalence of the disease and chief danger signals.

Meeting of Medical Veterans.—The trustees of the Medical Veterans of the World War will have a meeting in St. Louis at the same time of the meeting of the Association of Military Surgeons. The trustees of the veterans are: Col. Francis A. Winter, M. C., U. S. Army; Drs. Hubert Work, Pueblo, Colo.; Joel E. Goldthwait, Boston; George E. Brewer, New York City; John M. Dodson, Chicago, and Holman Taylor, Fort Worth, Texas.

Weeds and Hay-Fever.—As an endorsement of the efforts being made by the American Hay-Fever Association toward the reduction of the amount of pollen in the air, and the prevention or relief of suffering of many persons subject to hay-fever, the mayor of New Orleans issued a proclamation, August 17, urging all citizens to assist in the weed-cutting campaign, and asking the especial cooperation of the department of public property and the city board of health to the attainment of this end.

Occupational Therapy Society Meeting.—The National Society for the Promotion of Occupational Therapy will hold its third annual meeting in Chicago, September 8-11, at Bowen Hall at Polk and Halsted streets, under the presidency of Dr. William Rush Duncan, Jr. The general headquarters of the society during the conference will be at the Henry B. Favill School of Occupations, 825 West Polk Street. The annual banquet will be held, September 9, at the Hotel LaSalle, and September 11 will be spent in Milwaukee visiting hospitals in which occupational therapy is being employed.

Legislation for Study of Mentally Defective.—The study of feebleminded, backward and otherwise mentally handicapped schoolchildren by the Bureau of Education is provided for in a bill introduced by Congressman L. C. Dyer of Missouri. (H. R. 8479.) The measure provides for the establishment of a new bureau in the Bureau of Education to collect information regarding feebleminded children and for a mental laboratory to determine standards. A psychoeducational clinic is also provided. The sum of $30,000 annually for the maintenance of this bureau is appropriated. A director is to be appointed at a salary of $4,500.

Bequests and Donations.—The following bequests and donations have recently been announced:

Reading, Pa., Hospital, $12,500, on the death of his son, Leonard, by the will of J. C. Illig.

Tuxedo Hospital, Tuxedo Park, N. Y., $100,000, by the will of Augustus D. Juillard.

Methodist Hospital, Charlotte, N. C., a conditional bequest of $15,000, by the will of B. D. Heath.

For endowment of hospital bed in memory of Dr. Stephen Seymour, Chicago, $100,000, by the will of his daughter, Mrs. Catherine E. Brown.

Johns Hopkins University, Baltimore, $20,000, by the will of Mrs. Hannah J. R. Creswell, Elkton, Md.

National Exposition of Chemical Industries.—No profession in the United States has been benefited more greatly by the war than that of chemistry; the tentacles of foreign monopoly in this field are cast aside, and America, with her vast resources, especially in minerals and coal tar, trusts in the ingenuity of her own chemists. In the past two years the strides of our chemical accomplishments have come up to expectations; it is simply necessary now to reveal what will be the probable progress of a promising future. In this connection the forthcoming "National Exposition of Chemical Industries" at the Coliseum and First Regiment Armory in Chicago, September 22 to 27, will be of great interest to all scientists—indeed it promises to be the epitomized exhibit of the new flourishing advances in chemistry. The fields of organic chemistry pertaining to dyes, pharmaceuticals, and various organic technical products are being

developed in America in a most commendable manner; in fact, the best achievement of the organic chemist during the war was along these lines and not the explorations in the realm of poisonous gases. To the physician, the exposition may thus be well worthy of investigation. Also, the United States Bureau of Mines will feature the protection of the employee from disease, accident or hazard arising from the development of this new industry. Meeting in connection with the exposition are a number of technical societies, thus assuring a comprehensive program.

Report of Illinois Health Insurance Commission.—The Illinois Health Insurance Commission, appointed by legislative act in 1917, has just issued its report in a book of 647 pages. The report includes a general investigation as to the extent, cost, causes and results of sickness and death among wage earners and their families, and a number of reports of special investigations. After a brief report of the general findings of the committee, a majority and minority report are submitted. The majority report, signed by William Beye, chairman, William Butterworth, Dr. E. B. Coolley, Edna L. Foley, Mary McEnerney and M. J. Wright, first states the general amount of sickness existing according to the survey. It is estimated that probably 20 per cent. of all wage earners will be disabled for more than seven days in the course of a year by a sickness or nonindustrial accident, with an average of between twenty-seven and twenty-nine days for each wage earner disabled. It is estimated also that the cost of disabling sickness of wage earners alone in Illinois is about $57,000,000 annually; and, if to this is added the medical bills paid for dependents, the cost of sickness in wage earning families is between $80,000,000 and $86,000,000 per year. It was found that sickness was the cause, or an accompanying condition of the dependency in from one third to one half the cases in which charity was asked. Tuberculosis and other chronic conditions are found in from 20 to 25 per cent. of the cases in which sickness is a cause or condition of dependency. In an analysis of the vital statistics of the state, an unfavorable showing is made by the data available for Chicago, relating to deaths of children under 2 years of age, from enteritis and diarrhea. These figures have increased in Chicago while in New York, St. Louis, Boston and some other cities, they have decreased.

The majority report also analyzes existing legislation for public health, the tuberculosis problem, venereal problem, maternity care and infant welfare work, hospital facilities and public health nursing. In its consideration of health insurance, it concludes that "it is apparent that a compulsory Health Insurance system comes in contact with so many interests of the individuals or groups who constitute society and affects them so vitally that the question must be solved in the light of a public demand or necessity and the welfare of the people of the state as a whole." Analyzing results in those countries which already have such systems, the committee finds that "it seems clear that compulsory Health Insurance is not an important factor in the prevention of diseases or in the conservation of health." The majority report concludes, finally, that it is the opinion of the commission that its findings do not justify it in recommending compulsory health insurance.

The minority report, signed by Dr. Alice Hamilton and Mr. John E. Ransom, states that the investigations made for the commission are "conclusive evidence of the need for a system of compulsory health insurance which would be applicable to practically all members of the wage earning group and would more equitably distribute the burden of the costs of sickness and would make more adequate provision for the medical care of wage earners and their dependents who become sick."

FOREIGN

International Physiology Congress.—Preparations are said to be well under way for a gathering at Paris in July, 1920, of scientists especially interested in physiology. The meeting is being organized by representatives from Great Britain, France and America, and invitations are to be sent to the neutral nations.

French Urologic Congress.—The Nineteenth Congress of the Association française d'urologie is to convene at Paris, Oct. 8, 1919. The only subject yet announced for discussion is the treatment of nontuberculous pyelonephritis in man. The opening address on this topic is to be by Dr. Ertzbischoff of Paris. The secretary of the congress is Dr. O. Pasteau, avenue de Villars 13, Paris.

French Surgical Congress.—The Twenty-Eighth Congress of the Association française de Chirurgie is to convene at Paris, Oct. 6, 1919, Dr. C. Walther presiding. The three subjects appointed for discussion are: simple traumatic lesions of the wrist; tumors in the vicinity of the kidneys; and cancer of the tongue. The secretary-general is M. J. L. Faure, 10 rue de Seine, Paris.

Volunteer to Fight Typhus.—Ninety men from the First and Third Divisions, all soldiers who speak Polish, have volunteered to work in Poland against the typhus epidemic, and have left the Coblenz area, on the first stage of the journey to Warsaw. The unit from the American Expeditionary Forces will number 550, and will be under the command of Col. Harry L. Gilchrist and Lieut.-Col. Lee R. Dunbar, Medical Corps. There will be required to transport the equipment and chemicals of the expedition, 800 railway cars and 700 motor trucks.

Institute for Sexual Science Founded at Berlin.—The *Nederlandsch Tijdschrift voor Geneeskunde* relates that the *Deutsche medizinische Wochenschrift* describes the opening, July 1, of an institute for *Sexualwissenschaft*. It says, "It is housed in a special building in the Thiergarten at Berlin, and is in charge of Dr. Max Hirschfeld. There are departments for sexual biology, sociology, ethnology and medicine. It is equipped for psychotherapy, electrotherapy, organotherapy and radiotherapy, and has a laboratory for microscopic and chemical research."

Deaths in the Profession Abroad.—Dr. **A. Gouget,** recently appointed to the chair of general pathology and therapeutics at the Paris medical faculty after long service as *agrégé*, aged 51. He was co-director of the *Presse médicale* and had published numerous works on the influence on the kidneys of disease in the liver, on insufficiency of the liver, etc. During the war he was at the head of the military hospital at Toul.——Dr. **J. Gómez Ocaña,** professor of physiology at the University of Madrid, author and an international authority on physiology, life senator, president of the recent First National Medical Congress in Spain, aged 59.——Dr. **A. Demoulin** of Paris, instructor in surgery and well known by his *expertises chirurgicales*, aged 59.——Dr. **A. Raventos Aviño,** a prominent surgeon of Madrid.——Dr. **P. Reynier,** professeur agrégé of the Paris medical faculty, surgeon to the hospitals.

Association of Radiologists of the Northland.—The *Ugeskrift for Læger* mentions that the Norwegian radiologist, Dr. Heyerdahl, invited the radiologists of the Scandinavian countries to meet at Christiania in July, on the occasion of the Surgical Congress. At the meeting it was decided to found the Nordisk Forening for medicinisk Radiologie, and the first representative meeting is to be held at Copenhagen in 1921. A number of communications were presented, on deformity of the eyeball with duodenal ulcer; on radium treatment of vulvar cancer, and on gallstones from the radiologic standpoint. Our exchange adds that Sweden has gone to the front in radiology under Professor Forsell's leadership. The board of the new association is to comprise two members from each of the countries of the Northland, besides the president, Prof. J. F. Fischer. The appendix and exophthalmic goiter are the topics for next year's meeting.

LATIN AMERICA

New Leprosarium in Brazil.—There has been begun in Brazil the construction of a model leprosarium near Santo Angelo, which will be the best of its kind in all South America and have all facilities for the isolation and treatment of lepers.

Prize to Guglialmelli and Delbon.—The *Semana Médica* of Buenos Aires mentions that the Felix de Azara prize for the two years 1915 and 1916 has been awarded recently to Dr. L. Guglialmelli and Dra. A. Delbon for their work entitled "Study of Textile Fibers of Animal and Vegetable Origin."

Death of Dr. Triani.—The death of Dr. Juan Triani is reported from Uruguay. He was 86 years old, was in his youth a medical officer of the Italian Army and had been fifty years in Uruguay. He was one of the founders of the School of Medicine of Montevideo and professor of legal medicine there.

Brazilian Psychiatry Journal.—The foundation is announced of the *Archivos Brasileiros de Neuriatria e Psychiatria*, the first number of which has already appeared. There are four directors, all professors in these specialties, including Austregesilo and Vianna, and the editorial staff consists of four other specialists.

Child Welfare Work at Lima.—The *Reforma Médica* of Lima, Peru, describes the foundation and the purposes of the Sociedad Protectora de la Infancia recently organized

there under the initiative of the alcalde of the city. It aims to include also in its scope proper housing of wage earners and prophylaxis of transmissible diseases.

Institute of Physiology at Rio de Janeiro.—The Instituto Oswaldo Cruz has recently organized a section for physiology, with its special institute which has been placed in charge of Dr. M. Ozorio de Almeida. The only two other institutes in South America for teaching and research in physiology exclusively are at Montevideo and Córdoba.

New Preparatory School in Argentina.—A new preparatory medical school has been inaugurated at the University of La Plata where students will be able to study the first three years of the medical course. There is room for 200 students and the school will follow the plan of studies in force in the University of Buenos Aires. Dr. Pedro Belon is the dean.

Fiftieth Professional Anniversary of Rio de Janeiro Physician.—The Rio de Janeiro Medical Faculty and the board of the Muzeu Nacional joined together to do honor recently to the "golden jubilee" of Prof. B. F. Ramiz Galvão of the University of Rio de Janeiro. He was called on for a speech and he traced the history of the medical department of the university as he has witnessed it develop from small beginnings during the half century of his work there.

Inauguration of Institute of Radiology at Rio.—The new Instituto de Radiologia da Faculdade de Medicina at Rio de Janeiro was formally opened with much ceremony recently. The main floor is devoted to roentgen work and the radium and radioactive service is above. The latter is in charge of Profs. Fernando Terra and E. Rabello, while the chief of the roentgen department is Dr. R. Duque Estrada, assisted by Dr. Alipio Machado. Prof. Aloysio de Castro has been mainly instrumental in securing this addition to the equipment of the medical school.

Deaths in the Profession.—Dr. **José M. Jorge,** a well known physician and medical writer of Buenos Aires, whose son, José M. Jorge H. is on the editorial staff of the *Revista de la Asociacion Médica Argentina.*——Dr. **D. de Almeida Sampaio,** professor of forensic medicine at the University of Rio de Janeiro, medical expert for the courts and author of various works on medicolegal questions, aged 34.——Dr. **J. Testaseca,** formerly professor of pathology at the University of Montevideo, aged 84.——Dr. **B. Bonifacio,** member of the national legislature from Buenos Aires, professor of botany and zoology in the university and vice president of the *Circulo Médico,* aged 32.——Dr. **E. Mazzini** of Rosario, Argentina, victim of professional infection.——Dr. **Santiago Fornos** of Chivilcoy, near Buenos Aires, aged 55.——Dr. **J. N. Adamo,** a leading gynecologist and obstetrician of Mendoza, Argentina.——Dr. **J. Viaggio** of San Fernando, Argentina, aged 39.——Dr. **A. L. Cavo** of Buenos Aires, aged 49.

RIO DE JANEIRO LETTER

Rio de Janeiro, July 20, 1919.

Yellow Fever

No new case has been registered in Rio de Janeiro. The federal commissions in the northern states are actively engaged in combating the disease. In Bahia new cases have developed. In Alagoas and Sergipe, isolated cases have been reported. Since our last letter commissions have been sent to Pernambuco and Piauhy, but up to date no new cases have been reported.

New Hospital

The mayor of the city has opened a credit of $1,000,000 for the building of a charity hospital. It will be built in the vicinity of the medical school and will be regarded as an annex to that institution. It will contain all modern improvements and will be divided into different pavilions for medicine, surgery, obstetrics, skin diseases, etc.

The National Academy of Medicine

At the meeting, July 3, the National Academy of Medicine elected the following officers: president, Prof. Miguel Couto; vice president, Prof. Aloysio de Castro; first secretary, Garfield de Almeida; second secretary, Belmiro Valverde; speaker, Nascimento Gurgel; chairmen of the different committees: Austregesilo, Pinto Portella, Abreu Fialho, Carlos Seidl, Oscar de Sousa and Orlando Rangel.

Medical Bibliography

The National Academy of Medicine and the Medico-Surgical Society are compiling a catalogue of all medical publications that have appeared in Brazil within the last hundred years. This catalogue will be distributed in 1920 at the centennial of independence. At the same time a medical congress will be held in Rio de Janeiro under the supervision of Prof. Fernando Magalhães, president of the Sociedade de Medicina e Cirurgia. The program has not yet been definitely.

Child Welfare Congress

A child welfare congress is to be held in Rio de Janeiro in 1920. Its promotor is Dr. Moncorvo, director of the Instituto de Protecção á Infancia.

Death of Prof. Diogenes Sampaio

Diogenes Sampaio, professor of chemistry at the Rio de Janeiro University and one of the most prominent doctors in the medicolegal service, is dead. He was only 33 years old and stood high in his profession. The Society of Neurology, Psychiatry and Legal Medicine will hold a special session in his honor.

A New Medical Journal

The first number of the *Archivos de Neuriatria e Psychiatria* has appeared under the direction of Juliano Moreira, A. Austregesilo and Ulysses Vianna. This journal will be devoted principally to neurologic subjects. The *Archivos de Neurologia, Psychiatria e Medicina Legal* will treat principally of psychiatry and medicolegal questions.

Protection for Workmen

The government has passed a law for the protection of workmen against industrial accidents. A consulting commission of prominent physicians and lawyers has been appointed. The medical profession is represented by the director of the hospital for the insane, director of the medical school and the professors of hygiene and legal medicine.

The Question of Prof. Miguel Pereira's Successor

There are six candidates competing for the professional chair occupied by the late Dr. Miguel Pereira. Each of them has presented a thesis which will be defended before a committee of five professors to be chosen by the members of the medical school. The thesis of Dr. Rocha Vaz treats of "The Stomach and the Duodenum: Their Pathological Relations"; Dr. Clark's subject is "Syphilis of the Myocardium"; Dr. MacDowell has written on "New Human Spirochete Infections"; Dr. Henrique Duque will present a critical essay on "The Various Tests of Cardiac Efficiency"; Dr. Romeiro will discuss "Medical Semeiology," and Dr. Silva Mello will defend "Diagnosis of the Diseases of the Stomach: A Critical Study."

BUENOS AIRES LETTER

Buenos Aires, July 17, 1919.

Typhus Fever

We also had this year some cases of typhus fever in the northern part of the country, but the number was very small and the mortality very limited. This disease has prevailed to some extent in Santiago de Chile and in some other towns of the neighboring country, but apparently it has not crossed the Andes Mountains, and, for the time being, at least, there is no danger of this happening, since the heavy snow has completely interrupted all communication across the mountains.

Public Health Matters

Dr. Emilio Coni's resignation as president of the advisory council of the National Department of Hygiene has been accepted. Dr. Julio Méndez has been chosen to succeed him.

A commission has been appointed to submit a report on the best way to eradicate bubonic plague, a few sporadic cases of which occasionally occur in various parts of the country.

Antituberculosis Conference

The work of organization in anticipation of the second antituberculosis conference, which will be held at El Rosario, September 6-8, is proceeding with great enthusiasm. Various important organizations will be represented at the exposition which will be held in connection with the conference. The subjects for discussion will be: (1) best methods of prophylaxis; (2) compulsory health insurance, and (3) cheap sanitary lodgings.

Congress on Chemistry

The First National Congress on Chemistry was held in this city, July 9-16. The work of the congress scored an even greater success than was expected.

Male Sterility

Drs. Widacovich and Deluca call attention to the large proportion of men whose semen contains no spermatozoa, which amounts to 10 per cent. of those examined. These figures correspond to those recorded in other countries and show that in most cases the husband is responsible for the failure to have children.

Personal

The School of Medicine of the National University of Buenos Aires has submitted to the rector three lists of candidates from which to fill the professional vacancies in the departments of clinical epidemiology, otorhinolaryngology and genito-urinary diseases. The lists are headed by Drs. F. Destefano, E. V. Segura and B. Maraini, respectively.——The government has appointed the well known sanitarian, Dr. Emilio Coni, as director of the Santa Maria Sanatorium, which is the most important tuberculosis institution that exists in this country. Dr. Fonso Gandolfo will succeed him at the Buenos Aires dispensary.——The School of Medicine has appointed Dr. Alfredo Lanari as dean and Dr. J. B. Gonzalez as member of the council.——The Medical Association of Argentina has chosen Dr. Pedro Escudero president. The scientific meetings for the year have already begun at the new quarters of the association.

Exchange of Professors

Lectures have been given in the School of Medicine and before the medical association by Profs. F. Magalhães, Nascimento Gurgel and O. D'Utra Silva from Brazil, and by H. Garcia Lagos and D. Pratt from Uruguay. Other lectures by professors from Uruguay have been announced.

PARIS LETTER

PARIS, July 31, 1919.

Franco-American Medical Relations

In a previous letter (THE JOURNAL, Aug. 16, 1919, p. 546) I called attention to the appointment of a committee whose duty it should be to promote closer relations between French and American medical men.

Dr. Tuffier, professor on the faculty of the Paris School of Medicine, was assigned the task of reporting on the desirability of such a union and the best means of bringing it about. At the meeting of the Academy of Medicine, July 22, Dr. Tuffier presented his report. The available means of accomplishing the desired end may be grouped under three heads: exchange of ideas, exchange of students and exchange of scientific material. The first may be realized by Franco-American scientific periodicals published in French and English; by the exchange of all theses printed or made public at the various French and American universities, and by the exchange of professors with a view of securing at first hand the exposition of the results of their investigations. In the matter of exchange of students there are several questions to be considered. The undergraduate students will find it difficult to change countries on account of the necessity of preparing for their examinations. The postgraduate students who will make up the majority of those who will come to France to complete their studies in our clinics and in our laboratories, to visit our specialists and to carry on personal investigations—these are the ones to be chiefly considered from the standpoint of French medical instruction. The exchange of scientific material should include permanent exhibits of French instruments at all the universities of the United States.

The organization recently formed in Paris for the development of Franco-American medical relations will provide for daily instruction distributed throughout the day. Almost all the clinical instructors have evinced an interest in the organization. Furthermore, under the name of Collège des Etats-Unis à Paris, a number of American and French savants have established a bureau of information where Americans arriving in France may secure information in regard to all the courses given or to be given at the various scientific institutions of Paris. This "collège" will keep in correspondence with all American universities and all French institutions of learning.

Homage to Professor Vincent

Under the chairmanship of Dr. Louis Mourier, undersecretary of state for the army medical corps, the friends, admirers and pupils of Dr. Vincent, general medical inspector of the army and professor on the faculty of the Ecole d'application de médecine et de pharmacie militaires du Val-de-Grace, were entertained, July 29, at a banquet held in honor of Dr. Vincent's elevation to the rank of grand officer of the Legion of Honor.

Dr. Mourier gave a sketch of the life of Dr. Vincent and called attention to the part played in the winning of the war by the army medical corps in general and by the guest of honor in particular in saving from death and disease the thousands of French soldiers. M. Edmond Perrier, director of the museum of natural history; Dr. Baudet, surgeon of the hôpitaux de Paris, and Dr. Francois Helme also delivered speeches eulogizing Dr. Vincent.

The Conference of Chemists at London

The delegates of the Confédération chimique interalliée, representing approximately 30,000 chemists, recently met in conference at London, under the chairmanship of Dr. Charles Moureu, professor of organic chemistry in the Collège de France and a member of the Academy of Science. Some important business was transacted at this meeting. One of the most important resolutions concerns adoption of a common system of bibliographic documentation which will be carried out in England and in France.

At the close of the conference a delegation proceeded to Brussels to get in touch with the committee of the Conseil international de recherches with which the Confédération chimique interalliée is to be incorporated under the name of the Union internationale de la chimique pure et appliquée. The next conference will be held in Italy in June, 1920.

Establishment of a Place of Refuge for the Homeless

Near the outside fortifications of Paris a place of refuge destined to harbor temporarily the inhabitants of the devastated regions has been established. It is intended for refugees who are seeking to return to their homes and also for demobilized soldiers who are without shelter. Six barracks have been selected to furnish lodging. In the vicinity of the barracks there have been erected: a bath-house, a lavatory, an infirmary, a guard-house and a recreation hall for children, etc.

Personal

Dr. Lambert, professor on the faculty of the Nancy School of Medicine, has recently been transferred to the professorship of physics as applied to medicine.

Death of Dr. Albert Gouget

The death of Dr. Albert Gouget, a physician of the hôpitaux de Paris, recently appointed professor of general pathology and therapeutics at the Paris School of Medicine, has been announced.

Death of Dr. George Bertillon

Dr. George Bertillon, president of the Fédération des Syndicats médicaux, died recently at Maisson-Laffitte (department of the Seine-et-Oise). He was a brother of Alphonse Bertillon, the inventor of the system of anthropometric measurements used extensively in criminology, and also of Dr. Jacques Bertillon, director of the medical and surgical statistics bureau of the army.

LONDON LETTER

LONDON, Aug. 5, 1919.

The Presentation to Sir William Osler

The presentation to Sir William Osler of a collection of essays on the eve of his seventieth birthday at the house of the Royal Society of Medicine has been announced in a previous letter. A large audience, which included many leaders of the profession and the heads of the medical departments of the army and navy, assembled. The function was a remarkable, indeed a unique one, for the presentation was made by Sir Clifford Allbutt, the Nestor of the profession. Thus were brought together as the principal actors of the scene the Regius professors of the two great English universities, the greatest medical teachers of the day, each distinguished not only by medical eminence but by scholarship and literary power. Sir Clifford Allbutt, who claimed to be one of Sir William Osler's oldest friends, said that in him we saw the fruitfulness of the marriage of science and letters, and the long inheritance of a culture which amid the manifold forms of life and through many a winter and summer has survived to inspire and adorn a civilization which so lately narrowly escaped the fury of the barbarian. Sir William Osler, who at times spoke with emotion, said that the pride a man might justly feel at this demonstration of affection by colleagues on both sides of the Atlantic was deepened by two circumstances—the fact that amid so much mental

and physical tribulation his friends should have had the courage to undertake this heavy two-volume task, and that the honor was received at the hands of his brother Regius. Paying Sir Clifford Allbutt a graceful compliment, he said that to him had been given in fuller measure than to any other person in our generation a rare privilege: to him, when young, the old listened as eagerly as do now, when old, the young. The long list of contributors to the volumes recalled his vagrant career: Toronto, Montreal, London, Berlin and Vienna as a student; Montreal, Philadelphia, Baltimore and Oxford as a teacher. "To have had the benediction of friendship follow one like a shadow, to have always had the sense of comradeship in work, without the petty pinpricks of jealousies and controversies, to be able to rehearse in the sessions of sweet, silent thought the experiences of long years without a single bitter memory, fill the heart with gratitude. That three transplantations have been borne successfully is a witness to the brotherly care with which you have tended me. Loving our profession, and believing ardently in its future, I have been content to live in it and for it. A moving ambition to become a good teacher and a sound clinician was fostered by opportunities of an exceptional character, and any success I may have attained must be attributed in large part to the unceasing kindness of colleagues and to a long series of devoted pupils whose success in life is my special pride."

The contributions to the volumes number 150, and are from the pens of professional leaders on both sides of the Atlantic —physicians, surgeons, physiologists, anatomists, pathologists and historians. In keeping with Sir William Osler's interests, many of the subjects are educational. Among those contributed in this country are the introduction, by Sir Clifford Allbutt; "The Oxford Museum," by Dr. T. Dyke Acland; "The Oxford Medical School in the Eighteenth Century," by Dr. Arnold Chaplin; "The Problem of Graduate Medical Study in London," by Dr. J. G. Adami; "The Organization of Medical Research," by Sir Walter Morley Fletcher; "The Laboratory and the Ward," by Sir A. E. Garrod; "The Cradle of the Hunterian School," by Prof. Arthur Keith, and "Ideals for a Medical Library," by Mr. J. Y. W. MacAlister.

The Law and Professional Secrecy

Recently (The Journal, July 12, p. 124) I called attention to a case in which a girl was prosecuted for concealment of birth. A physician called in did not think it was his duty to inform the police, as it would have been a breach of professional confidence. The judge took occasion to lecture the physician, telling him that he was wrong, as there could be no professional confidence in criminal cases. If a patient cut another person's throat it would be his duty to inform the police. There was no difference between the two cases. This view is certainly not accepted by the medical profession, as a letter to the *British Medical Journal* from Sir John Tweedy, president of the Medical Defense Union, shows. He states that the council of the union is unable to accept the analogy as a fair one. The standpoint of the medical profession has more than once been challenged by the legal profession. The council nevertheless maintains that the duty of a physician to his patient is paramount, and advises any member seeking guidance that any communication made to him by a patient and any information acquired in such attendance are confidential, and that without the authority of the patient a physician is precluded by the canons of his profession from disclosing such information.

The British Medical Association Rejects Trade Unionism

At the annual meeting of the representatives of the British Medical Association, the question of trade unionism came up again. The following resolution was moved by the Bournemouth representative: "That, although the council of the association should be given every opportunity of circulating its reasons against the organizing of the profession on trade union lines, it should not endeavor to prevent such members of the association as may not be convinced by the arguments used from joining any other body which is attempting to combine the profession on such lines, and should encourage conferences with all bodies, representing members of the profession, to secure joint action to obtain satisfactory conditions of practice." The resolution, of course, referred to the Medicopolitical Union, a body described previously in The Journal. An animated discussion followed in which the hostility of the union to the association, while at the same time proffering cooperation, was the subject of comment. The chairman of the council said there was scarcely a single line of activity in which the union had not vilified the association. The motion was rejected by a majority of 75 to 17.

Marriages

Herbert Rowell Stoltz, Capt., M. C., U. S. Army, Stanford University, California, on duty with the American Army of Occupation, to Miss Sarah E. Adams of St. Joseph, Mo., in Paris, recently.

Clarence Pennell Baxter, Major, M. C., U. S. Army, on duty in Porto Rico, to Miss Mary Lyons Hartley of Washington, D. C., August 20.

Michael Xavier Sullivan, U. S. P. H. S., Spartanburg, S. C., to Miss Rachel Brook of Carrollton, Ga., at Asheville, N. C., July 28.

Richard Horace Hoffman to Miss Martha Janet Beecher Wyndham, both of New York City, at Pelham Bay, N. Y., August 10.

William Hart Elmer, Rockford, Ill., to Miss Lenore Crompton of Beaconsville, P. Q., Can., August 12.

Oliver Paxton Board, Birmingham, Ala., to Miss Helen Shaw of England, at Detroit, recently.

Ira Lincoln Fetterhoff, Baltimore, to Miss M. Alice Burton of Washington, D. C., August 13.

Jean Felix Picard, Lausanne, Switzerland, to Miss Jeannette Ridlon of Chicago, August 19.

Joseph Michael Blake, Chicago, to Miss Cecile Mary Schug of Moline, Ill., July 12.

Horace Ernest Ayers to Miss Muriel Randle Peck, both of New York City, August 6.

Ralph L. Maxwell to Mrs. Maude M. Maxwell, both of Little Rock, Ark., August 8.

Harold Albert Bachmann to Miss Craita Reiss, both of Sheboygan, Wis., recently.

Deaths

Henrietta Martha Thomas, Baltimore; Woman's Medical College of Baltimore, 1904; aged 40; a member of the staff of the Thomas Wilson Sanatorium for Children, Mount Wilson, Baltimore County; who went to England in 1914, and associated herself with the Society for the Relief of Destitute Aliens, and after the United States entered the war, devoted herself to work among the destitute alien children in England; died suddenly in York, England, August 4, from heart disease.

Charles L. Gregory, Greenville, Texas; University of Tennessee, Nashville, 1890; once city physician of Greenville; for two terms president of the Hunt County (Texas) Medical Society; formerly superintendent of the North Texas Insane Asylum, Terrell, and recently appointed superintendent of the new state hospital at Rust; president and superintendent of the Parkview Retreat, Greenville; died suddenly in that institution, August 11.

Herman Edward Street, Brooklyn; New York Homeopathic Medical College, 1892; aged 73; visiting dermatologist to the Cumberland Street Hospital, Brooklyn; a member of the consulting staff of the Brooklyn Memorial Hospital for Women, and an examiner in lunacy; died in the Peck Memorial Hospital, Brooklyn, August 18, two days after an operation for peritonitis.

Arthur Meeker Collier, Utica, N. Y.; College of Physicians and Surgeons, 1889; aged 54; from 1891 to 1895 physician at the Binghamton State Hospital; and then for a year first assistant physician at the New York State Hospital, Ogdensburg; died in St. Luke's Hospital, Utica, August 4, from paralysis.

John Russell Dickson, Gettysburg, Pa.; University of Pennsylvania, Philadelphia, 1880; aged 66; physician to the Adams County Poor Farm for nine years; county medical inspector and physician in charge of the State Tuberculosis Dispensary since 1908; died at his home, August 13, from cerebral hemorrhage.

John Henry Barnes ⊕ Enid, Okla.; Hospital College of Medicine, Louisville, 1901; aged 47; secretary of the Garfield County Medical Society in 1908; a specialist on diseases of the eye, ear, nose and throat; died at a hospital in Minneapolis, August 8, from valvular heart disease.

⊕ Indicates "Fellow" of the American Medical Association.

Julia Pauline Larson, San Francisco; University of California, San Francisco, 1900; resident physician of the Children's Hospital, San Francisco, for five years, and a member of the surgical staff for eight years; died in Stephenson, Merced County, Calif., July 17.

William R. Rodes, Mexico, Mo.; Jefferson Medical College, 1859; aged 83; a member of the Missouri State Medical Association; once superintendent of State Hospital No. 3, Nevada, Mo.; died at his home, August 4, from valvular heart disease.

John A. Pettit, Buffalo; University of Buffalo, 1874; aged 76; a member of the Medical Society of the State of New York; from 1895 to 1899 deputy health commissioner of Buffalo; died at his home, August 6, from pernicious anemia.

Mary Blair Moody ✠ West Haven, Conn.; University of Buffalo, N. Y., 1876; aged 82; the first woman graduate of the medical department of the University of Buffalo; a botanist of high repute; died at her home, August 18.

John Ruggles Greenleaf, Gardner, Mass.; College of Physicians and Surgeons in the City of New York, 1865; aged 78; a member of the Massachusetts Medical Society; died at his home, June 8, from acute dilatation of the heart.

Thomas Hagarty, East St. Louis, Ill.; St. Louis College of Physicians and Surgeons, 1896; aged 54; a member of the Illinois State Medical Society; was run over and killed by an interurban car in East St. Louis, August 14.

Franklin Harmon Godfrey ✠ Bloomington, Ill.; Miami Medical College, Cincinnati, 1877; aged 71; president of the McLean County Medical Society from 1900 to 1902; died at his home, August 8, from cerebral hemorrhage.

Ulysses Grant Galloway, South Bend, Ind.; Kentucky School of Medicine, Louisville, 1893; aged 52; a member of the Indiana State Medical Association; died at his home, August 12, from malignant disease.

Lyell J. Lescher, Mount Carmel, Ill.; Jefferson Medical College, 1877; aged 62; a member of the Illinois State Medical Society; died at his home, July 21, from ulcerative endocarditis following influenza.

Pedro Florentine Francke, New York City; College of Physicians and Surgeons in the City of New York, 1892; aged 53; died in the Peter Bent Brigham Hospital, Boston, August 19.

Fred Heller ✠ Brownstown, Ind.; Kentucky School of Medicine, Louisville, 1898; aged 51; a member of the Brownstown school board; died suddenly, August 11, from heart disease.

Edward Baron Chandler, Moncton, N. B.; College of Physicians and Surgeons in the City of New York, 1871; aged 71; died at his home, May 13, from valvular heart disease.

Howard Cecil Sarver ✠ **Lieut., M. C., U. S. Army,** Charleston, W. Va.; American College, St. Louis, 1912; aged 31; died at his home, July 24, from cerebral hemorrhage.

Joseph Frank Meagher, San Francisco; University of California, San Francisco, 1902; aged 42; died at his home, August 15, from endocarditis following influenza.

Edward McDonald ✠ Cuba, Wis.; Rush Medical College, 1879; aged 68; a member of the Grant County board; died at his home, August 7, from cerebral hemorrhage.

Lewis Lorenzo Lacey, Austin, Texas; Bellevue Hospital Medical College, 1874; aged 68; died in the City Hospital, Austin, May 11, from cerebral hemorrhage.

John Marquand Wagner, Newman, Ill.; Bellevue Hospital Medical College, 1878; aged 76; died at his home, June 10, from chronic diffuse nephritis.

Nathan L. Bailey, Lake Preston, S. D.; Keokuk (Iowa) Medical College, 1892; aged 58; once mayor of Lake Preston; died at his home, August 5.

Carl Herman Stein ✠ Pittsburgh; University of Pittsburgh, 1912; aged 44; died at the home of his sister in Pittsburgh, August 5, from pneumonia.

Marcus Claude Terry ✠ Brighton, Iowa (license, years of practice, Iowa, 1886); aged 75; a practitioner since 1864; died at his home, recently.

Robert S. Bosher, Jr. ✠ Richmond, Va.; Medical College of Virginia, Richmond, 1900; aged 45; died at his home, July 20.

William Harrison Lane, Miller, S. D.; Bellevue Hospital Medical College, 1882; aged 75; died at his home, in July.

George C. Somers, Los Angeles; Rush Medical College, 1880; aged 77; died at his home, July 6.

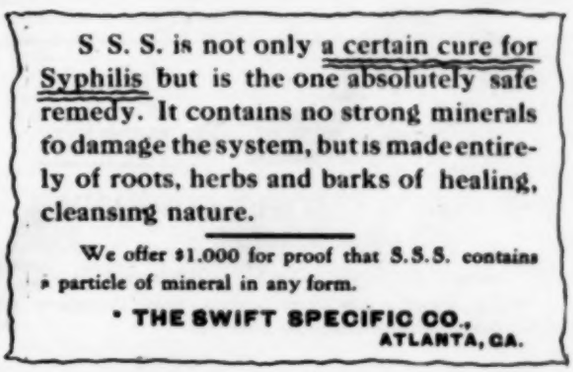
The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

S. S. S.

The One-Time Cure for "Contagious Blood Poison" Becomes a Remedy for Rheumatism

As a general thing, federal laws get action where state laws fail. One has only to call to mind the innocuousness of the average state law—there are happy exceptions—governing the sale of food and drugs, and compare it with the federal law covering much the same field, to realize the advantages of national legislation over state legislation. Occasionally it happens that the states are able to bring about reforms in the interest of the public that the federal government has failed to achieve. Readers of THE JOURNAL will remember the case referred to a few years ago regarding the result of North Dakota's net-weight law. Before there was any national legislation on the subject of requiring package goods to be plainly labeled with the net-weight of the contents, North Dakota had such a law, and what is more important, enforced it. As a result, one of the largest manufacturers of biscuits withdrew its business from that state rather


S S. S. is not only a certain cure for Syphilis but is the one absolutely safe remedy. It contains no strong minerals to damage the system, but is made entirely of roots, herbs and barks of healing, cleansing nature.

We offer $1.000 for proof that S.S.S. contains a particle of mineral in any form.

THE SWIFT SPECIFIC CO.,
ATLANTA, GA.

A page from one of the older booklets sent out by the Swift Specific Company. At that time the concern made no secret of the claim that S. S. S. was offered as "the one absolutely safe" and "certain cure for syphilis."

than comply with the law. The people of North Dakota, however, were favorably situated to go into the biscuit making business themselves, and did so, putting out their products in compliance with the laws of their own state. After a few years the concern which had withdrawn its business from North Dakota reentered that state with its products labeled in accordance with the requirements of the North Dakota law. The important point is that the people in every state of the Union benefited by the reforms brought about by the law of one state.

Still another instance of a state law benefiting the nation arose in the case of the prosecution against "Hall's Catarrh Cure" by the state of Nebraska. For years after smaller and less powerful "patent medicine" makers had been forced by the federal authorities to remove the word "cure" from their trade packages, the Hall nostrum was sold as a "cure." Finally the company was prosecuted under the Nebraska laws. Later this item appeared in a drug journal:

"Cheney & Co., of Toledo, Ohio, asked leave to dismiss their appeal to a district court in Nebraska, in the action of the state food and drug department to have 'Hall's Catarrh Cure' declared misbranded in the use of the word cure. The company also expressed its purpose of changing the name of its preparation to 'Hall's Catarrh Medicine.'"

Soon thereafter it became "Hall's Catarrh Medicine" all over the United States; it continued to be a "cure" in Canada for some years.

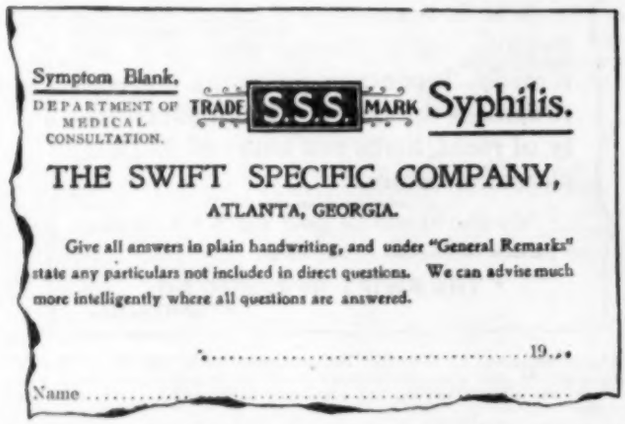
Now comes the state of Louisiana in the rôle of a possible national benefactor. That state has a law prohibiting the sale

of venereal disease remedies except on the written prescription of a licensed physician. In May of this year the Bureau of Venereal Diseases of the Louisiana State Board of Health notified the druggists of Louisiana that the sale of "S. S. S." ("Swift's Syphilitic Specific" or "Swift's Sure Specific") would meet with the same law enforcement measures as were being waged against any venereal disease nostrum. The immediate result of this notice was a letter sent to various drug stores in Louisiana by the sales manager of the Swift Specific Company, breathing, alike, injured innocence and defiance. The company was inexpressibly shocked to learn that its product should be classed as a venereal remedy. Said the sales manager:

"We wish to state emphatically that this is a misrepresentation of facts. Please accept this letter as our positive guarantee that S. S. S. is not recommended or advertised as a Venereal medicine. We challenge any one to find on our package or in any of our advertising in the newspapers or elsewhere any statement or claim that S. S. S. is good for Venereal diseases.

"It is difficult to understand why such a ruling could be made, and would suggest that you challenge, by letter, the right of the State Board of Health to forbid you to sell S. S. S., or anything else, on such a pretext. Doesn't it appear very peculiar that they should construe S. S. S. to be a Venereal remedy, and prevent you from selling it, when it is positively not so advertised or recommended? In no other state has its sale ever been questioned."

The letter closed with a suggestion to the effect that the druggist go ahead and sell S. S. S., and that they would be supported by the company. Was it "very peculiar" that the Bureau of Venereal Diseases of the State Board of Health of Louisiana "should construe S. S. S. to be a Venereal remedy?" Let us see: It was only a few years ago that


Symptom Blank.

DEPARTMENT OF MEDICAL CONSULTATION.

TRADE S.S.S. MARK Syphilis.

THE SWIFT SPECIFIC COMPANY,

ATLANTA, GEORGIA.

Give all answers in plain handwriting, and under "General Remarks" state any particulars not included in direct questions. We can advise much more intelligently where all questions are answered.

....., 19..

Name .....

Photographic reproduction (reduced) of part of a "symptom blank" sent out in November, 1916, by the S. S. S. concern to a person who wanted medical advice in the treatment of syphilis.

S. S. S. was boldly and blatantly heralded in large display newspaper advertisements as a "cure" for syphilis, or, as it was more euphemistically described in the advertisements, "Contagious Blood Poison." As newspapers became a little more careful of the type of "patent medicine" copy they would accept, the Contagious Blood Poison advertisements were soft-pedaled, while "Rheumatism," "Catarrh," and "Impure Blood" were played up as the ailments for which S. S. S. was recommended. In the trade packages, however, the purchaser of S. S. S. was urged to write for the "special book on the blood," which he was told "goes deeply into the subject of mercury, iodid of potash, arsenic and other mineral drugs." Those who sent for the booklet learned from it that it would "enable one to properly treat syphilis under the use of S. S. S., together with such medical advice as we give gratis by correspondence." They learned further from this booklet that:

". . . those unfortunates who have fallen into the clutches of that great enemy, Syphilis . . . may be said to have been without an adequate treatment until the virtues of S. S. S. were made known to them."

According to this booklet, further, S. S. S. had:

". . . become a household necessity in various forms of blood poisoning, and especially effective in that most destructive and distressing of all forms of it, the contagious poison, known as Syphilis."

Letters that have been sent out by the Swift Specific Company during the past few years, and which THE JOURNAL has in its files—letters that were written to individuals who had indicated to the company that they had syphilis—have made such claims as:

"In S. S. S. we have the only vegetable antidote to Syphilis that has ever been discovered . . ."

"For more than 40 years S. S. S. has been recognized as the one remedy for Syphilis. Thousands upon thousands have been cured through its use."

In one of the older booklets, a portion of which is reproduced with this article, the claim appeared in black, bold-faced type:

"S. S. S. is not only a certain cure for Syphilis, but is the one absolutely safe remedy."

We could continue to quote statement after statement, made in the S. S. S. advertising, advocating both by the most direct of statements and also by inference the claim that S. S. S. is a cure for syphilis.

But the Swift Specific Company evidently saw—in the action of the authorities in Louisiana—the hand-writing on the wall and a few weeks ago the State Board of Health of Louisiana received this letter from the general manager of the Swift Specific Company:

"In accordance with a resolution adopted by the Board of Directors of the Swift Specific Company, a copy of which resolution I am herewith enclosing you, the S. S. S. Company, through me as the Manager of said company, does hereby guarantee that in every advertisement published in the State of Louisiana, as well as on the labels and cartons containing the product of the Swift Specific Company, there will be a statement in the same size type as the rest of their advertising that S. S. S. is not sold for the treatment, for the cure or as a remedy for venereal diseases."

This letter was dated June 26, 1919. On Aug. 20, 1919, a bottle of S. S. S. was purchased in Chicago. The drug clerk was asked particularly whether it was "new stock," he declared that they "got it in a few days ago." The carton in which this bottle came still holds out by inference the claim that S. S. S. is a remedy for syphilis. Thus:

"$1000 is offered for proof that it contains one particle of Mercury, Potash, Arsenic, or any other mineral drugs."

"Persons who for any reason do not wish to use mercury, potash, arsenic, or other minerals, may take S. S. S. with the full assurance that it contains none of these ingredients."

On the circular that came with the bottle—"adopted and approved" Jan. 1, 1918—there is this statement:

"S. S. S., being compounded of vegetable plants, and having no Mercury, Potash, Arsenic, or other mineral drugs in its composition, may be taken for an indefinite period."

There is no statement anywhere to the effect that "S. S. S. is not sold for the treatment, for the cure or as a remedy for venereal diseases." Does this mean that the Swift Specific Company is going to put up special cartons and advertising copy for the state of Louisiana, or does it mean that the bottle purchased a few days ago in Chicago had been in the hands of a jobber for some months?

On Aug. 21, 1919, a bottle of S. S. S. was purchased in Louisiana. The $1,000 "offer" quoted from the carton of the Chicago sample, read in the case of the Louisiana sample, thus:

"$1000 is offered for proof that it contains one particle of mineral drugs."

On the circular that came with the bottle—"adopted and approved" June 25, 1919—there is this statement:

"S. S. S. being compounded of vegetable plants and having no Mercury, Potash or other mineral drugs in its composition may be taken for an indefinite period. Its effect is recognized as being beneficial to the system."

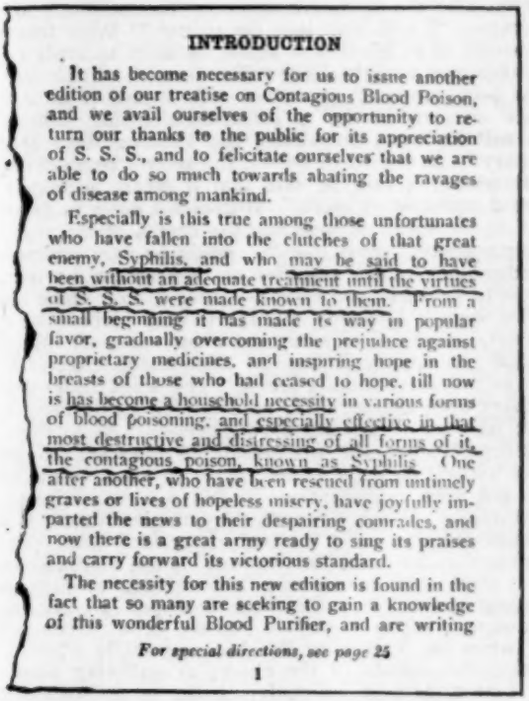
The circular also bore the following paragraph:

"S. S. S. is a medicinal agent indicated in the treatment of Rheumatism, Catarrh, Malaria, Eczema and Skin Diseases, arising from conditions of the blood. It has been extensively employed in the treatment of such diseases. Under certain laws, remedies and treatments for venereal diseases must be sold on written prescription of a licensed physician. This preparation is not sold for such diseases."

The paragraph just quoted also appeared on a small sticker pasted on the carton.

Years ago S. S. S. was solemnly announced as a cure for cancer: "That S. S. S. cures cancer is a fact that experience has placed beyond doubt." But public opinion has long frowned on the "cancer cure" business and for some years nothing seems to have appeared in the S. S S. literature regarding its alleged curative effects in that disease. The public is now waking up to a fact that the medical profession has been attempting to hammer home for years: the self-treatment of venereal disease is not only fraught with danger to the individual, it is a menace to the community.

Public opinion has reached the stage at which it will support laws prohibiting the sale of nostrums for the self-treatment of venereal disease; this, too, in spite of the fact that the "patent medicine" interests insist that there is no valid reason why the individual should be deprived of the right to buy and use remedies for the self-treatment of venereal disease. Such being the case, S. S. S. will perforce drop its long advertised claim as a remedy for syphilis. Even so it will not be possible to eliminate from the consciousness or subconsciousness of thousands of individuals who have read the advertisements in the past or have been given the



INTRODUCTION

It has become necessary for us to issue another edition of our treatise on Contagious Blood Poison, and we avail ourselves of the opportunity to return our thanks to the public for its appreciation of S. S. S., and to felicitate ourselves that we are able to do so much towards abating the ravages of disease among mankind.

Especially is this true among those unfortunates who have fallen into the clutches of that great enemy, Syphilis, and who may be said to have been without an adequate treatment until the virtues of S. S. S. were made known to them. From a small beginning it has made its way in popular favor, gradually overcoming the prejudice against proprietary medicines, and inspiring hope in the breasts of those who had ceased to hope, till now is has become a household necessity in various forms of blood poisoning, and especially effective in that most destructive and distressing of all forms of it, the contagious poison, known as Syphilis. One after another, who have been rescued from untimely graves or lives of hopeless misery, have joyfully imparted the news to their despairing comrades, and now there is a great army ready to sing its praises and carry forward its victorious standard.

The necessity for this new edition is found in the fact that so many are seeking to gain a knowledge of this wonderful Blood Purifier, and are writing

For special directions, see page 25

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Photographic reproduction (reduced) of page 1 of a booklet sent to the same individual who received the "symptom blank," a part of which is reproduced with this article. Note the statements which we have underlined.

information by word of mouth, the belief that S. S. S. *is* a remedy for syphilis! There are on the market today a score of worthless nostrums purchased by foolish women in the belief that they are abortifacients; yet in no instance do the manufacturers of these products dare specifically to announce them as such. The hundreds of thousands of dollars expended in the past by the Swift Specific Company to bring home to a certain part of the population the alleged fact that S. S. S. is a "purely vegetable" cure for "Contagious Blood Poison" cannot be wiped out of the public consciousness by the declaration on the part of the manufacturers that "S. S. S. is not sold for the treatment, for the cure or as a remedy for venereal diseases." Furthermore, it is worth noting that the manufacturers do not actually disclaim their previous pretenses. They do not come out boldly and say "S. S. S. will not cure venereal disease." All they do is more cautiously to announce that it is "*not sold for* such diseases."

The principle on which most "patent medicines" are exploited seems to be: Lie when you can; tell as little of the truth as you must.

Correspondence

SIR WALTER SCOTT'S LAMENESS

To the Editor:—Reference has recently been made, by Crookshank and others, to the childhood lameness of Sir Walter Scott as a definite case of infantile poliomyelitis. The attack came on in 1773, when Scott was about 18 months old, some ten years before the publication of Michael Underwood's well-known account of the disease (1784). The details, as given in Lockhart's Life of Scott, may be not uninteresting to American physicians:

I showed every sign of health and strength until I was about eighteen months old. One night, I have often been told, I showed great reluctance to be caught and put to bed, and after being chased about the room, was apprehended and consigned to my dormitory with some difficulty. It was the last time I was to show such personal agility. In the morning I was discovered to be affected with the fever, which often accompanies the cutting of large teeth. It held me three days. On the fourth, when they went to bathe me as usual, they discovered that I had lost the power of my right leg. My grandfather, an excellent anatomist as well as physician, the late worthy Alexander Wood, and many others of the most respectable of the faculty, were consulted. There appeared to be no dislocation or sprain; blisters and other topical remedies were applied in vain. When the efforts of regular physicians had been exhausted, without the slightest success, my anxious parents, during the course of many years, eagerly grasped at every prospect of cure which was held out by the promise of empirics, or of ancient ladies or gentlemen who conceived themselves entitled to recommend various remedies, some of which were of a nature sufficiently singular. But the advice of my grandfather, Dr. Rutherford, that I should be sent to reside in the country, to give the chance of natural exertion, excited by free air and liberty, was first resorted to, and before I have the recollection of the slightest event, I was, agreeably to this friendly counsel, an inmate in the farmhouse of Sandy-Knowe. . . . It is here at Sandy-Knowe, in the residence of my paternal grandfather, already mentioned, that I have the first consciousness of existence; and I recollect distinctly that my situation and appearance were a little whimsical. Among the odd remedies recurred to to aid my lameness, some one had recommended that so often as a sheep was killed for the use of the family, I should be stripped and swathed up in the skin, warm as it was flayed from the carcass of the animal. In this Tartar-like habiliment I well remember my grandfather, a venerable old man with white hair, used every excitement to make me try to crawl. I also distinctly remember the late Sir George MacDougal of Makerstoun, father of the present Sir Henry Hay MacDougal, joining in this kindly attempt. He was, God knows how, a relation of ours, and I still recollect him in his old-fashioned military habit (he had been colonel of the Greys), with a small cocked hat, deeply laced, and embroidered scarlet waistcoat, and a light-coloured coat, with milk-white locks tied in a military fashion, kneeling on the ground before me, and dragging his watch along the carpet to induce me to follow it. The benevolent old soldier and the infant wrapped in his sheepskin would have afforded an odd group to uninterested spectators. This must have happened about my third year, for Sir George MacDougal and my grandfather both died shortly after that period. . . . I was in my fourth year when my father was advised that the Bath waters might be of some advantage to my lameness. My affectionate aunt, although such a journey promised to a person of her retired habits anything but pleasure or amusement, undertook as readily to accompany me to the wells of Bladud, as if she had expected all the delight that ever the prospect of a water-place held out to its most impatient visitants. My health was by this time a good deal confirmed by the country air, and the influence of that imperceptible and unfatiguing exercise to which the good sense of my grandfather had subjected me; for when the day was fine, I was usually carried out and laid down beside the old shepherd, among the crags or rocks round which he fed his sheep. The impatience of a child soon inclined me to struggle with my infirmity, and I began by degrees to stand, to walk, and to run. Although the limb affected was much shrunk and contracted, my general health, which was of more importance, was much strengthened by being frequently in the open air, and, in a word, I who in a city had probably been condemned to hopeless and helpless decrepitude was now a healthy, high-spirited, and, my lameness apart, a sturdy child—*non sine diis animosus infans.*

The shrinking and contraction of the limb is strongly suggestive of the affection described by Underwood and Heine. There have even been apparent figurations of the disease in art, for instance, on an Egyptian stele of the eighteenth dynasty in the Carlsberg Glyptothek at Copenhagen (*Bull. Soc. franc. d'hist. de méd.*, Paris, **10**:408, 1911); or the picture of the paralytic beggar boy by Ribera in the Vienna gallery. In a footnote to the article on Sir Walter Scott in the ninth edition of the Encyclopaedia Britannica (p. 545), Dr. Charles Creighton says that Scott's primary trouble was "a swelling at the ankle, and either consisted in or gave rise to arrest of the bone-forming function along the growing line of cartilage which connects the lower epiphysis of each of the two leg-

bones with its shaft. . . . The limb would have been blighted very much more if the arrest of growth had taken place at the upper epiphysis of the tibia or the lower epiphysis of the femur. The narrowness and peculiar depth of Scott's head point to some more general congenital error of bone-making allied to rickets, but certainly not the same as that malady. The vault of the skull is the typical 'scaphoid' or boat-shaped formation, due to premature union of the two parietal bones along the sagittal suture." Creighton goes on to say that this synostosis of cranial bones is characteristic in microcephalous idiots, and he relates that an eminent French anthropologist, who saw a microcephalic skull in the Cambridge Museum of Anatomy, pointed to the scaphoid vault of the crown and the effaced sagittal suture, with the exclamation: "Voilà Walter Scott!" Scott's brain was found to be small in size after death, a fact of little moment in itself, since there is apparently no special relation between cranial capacity, brain weight and ability. Turgenieff and Cuvier had the largest and heaviest brains, Shelley, Scott, Mozart, Gambetta and others, among the smallest.

F. H. Garrison, M.D., Washington, D. C.

"THE ADMINISTRATION OF ARSPHENAMIN"

To the Editor:—In the letter by Director McCoy of the Hygienic Laboratory, "The Administration of Arsphenamin" (The Journal, July 12, 1919, p. 130), there appears the statement that when only one of several physicians using arsphenamin of the same batch "registers complaint as to the quality of the drug, and the others use it with satisfaction, there seems to be no other conclusion than that the mode of administration in the exceptional case was at fault."

In such case I believe there is at least one other justifiable conclusion: that arsphenamin, perhaps insufficiently dried, will in the course of six months or a year develop toxic by-products in the ampule, and that the amount present will vary with the length of time that elapses before the contents are used and perhaps according to the conditions under which it has been stored. Conceivably such a product may pass the biologic tests at the time of manufacture, and later produce distressing symptoms in human beings. Dr. Hugo Freund, who had been using the "product which enjoys a particularly high reputation" with entire satisfaction, recently reported to me four successive delayed reactions in as many patients. The symptoms were vomiting and an itching dermatitis, occurring from one to four days after administration of the drug. An ampule was examined and was found to be sound, but the contents gave a solution with the characteristic gun-metal tinge due to oxidation. It can be readily demonstrated that arsphenamin will shed metallic arsenic when it has become oxidized, whereas the unchanged base will not do so when reduced with zinc and hydrochloric acid. The so-called nitritoid reactions may also be induced by factors other than dilution and alkalization, however important the latter may be. Ehrlich and Bertheim, in 1912, stated that "salvarsan" contained about 7 per cent. of methyl alcohol, after having been dried for two hours, and in 1918 the two brands of American arsphenamin examined by me were similarly found to contain it. I believed then, as I do now, that this alcohol acts on the base in the ampule, and that a certain amount of methyl arsin may thus accumulate, and when intravenously injected may cause the nitritoid reactions; and according to the amount that may thus have accumulated, the rapidity of injection and the concentration of the solution, cardiac paralysis may result. Kober, working independently, has reached much the same conclusions, and has further succeeded in preparing arsphenamin, free of methyl alcohol, and according to his tests of a lower toxicity. Neo-arsphenamin can be made without the use of methyl alcohol, and this undoubtedly explains the long series of injections reported by Dr. H. McClure Young (The Journal, July 12, p. 131), who used a French brand, in high concentrations, without reactions.

In the decade that has elapsed since the introduction of arsphenamin into therapeutics, the majority of practitioners surely should have been able to master the technic of measuring water and counting drops of alkali according to printed directions. I believe there is room for improvement in the drug itself as well as in our methods of administering it.

John B. Rieger, M.D., Detroit.

STETHOSCOPE OR STETHOPHONE

To the Editor:—Referring to your editorial on Laënnec and the stethoscope, you give the Greek word σκοπεῖν to mean "to examine." Could not the word also be translated "to view" or "to observe"? The ending "scope" being associated with all instruments used for examining by sight, as the telescope, microscope, spectroscope, etc., it seems an error to couple it with a sound-transmitting instrument, the ending "phone" or "fone" being universally used in the latter connection, as telephone, microphone, etc.

Eugene Kerr, M.D., Towson, Md.

[Comment.—As stated, σκοπεῖν may mean "to view"; in fact, that is the ordinary meaning of the word, while "to look to, to consider, to examine" are common figurative meanings. Compare, in this connection, "to look into" in English, which has also the figurative meaning "to examine into"; as, for instance, "I will look into the matter." With regard to the question as to whether it would be more accurate to call the stethoscope a stethophone: The term "stethophone" has already been proposed by others who regard it as a more accurate designation for a sound-transmitting instrument, and it will be found duly listed in "The American Medical Dictionary." In regard to φωνεῖν, the second component part of stethophone, it may be said that it means primarily "to produce a sound or to speak." It does not seem to mean "to sound," as we speak of sounding the depths of the sea; if it did, "stethophone," chest sounder, might be very appropriate. A "stethophone," then, signifies an instrument for making the chest to *sound* or to *resound*. Since it does make almost inaudible sounds distinctly audible it may perhaps be said, figuratively speaking, to make the chest *resound;* but, from an actual standpoint, it has no appreciable effect on the quality of the chest sounds per se. The word "microphone" might have been appropriately used for the stethoscope, since it is an instrument for magnifying sounds. As to the term "stethoscope," since the instrument in question, to which Laënnec himself gave the name, serves to examine the chest, it does not seem inappropriate to call it a "stethoscope," a chest examiner. When, however, the same instrument is used to examine the arteries or the beat of the fetal heart, one has the feeling that the name "stethoscope" is not a broad enough term. It might well be termed a "phonoscope," an instrument for testing sounds, or a "microphonoscope," an instrument for examining scarcely audible sounds, or a "stethophonoscope," when the instrument has been especially adapted for examining the sounds of the chest; or suffering humanity could, if necessary, be inflicted with the term "stethomicrophonoscope," which would mean an instrument for examining the scarcely audible sounds of the chest. This term ought to be "descriptive" enough to satisfy anybody. For short, "stethoscope" does very well. It may be added that the modern Greeks have accepted the term "stethoscope," since they call the instrument στηθοσκόπιον.—Ed.]

CENTENARY OF THE STETHOSCOPE

To the Editor:—Recently, in looking over a first edition of Laënnec's "Auscultation Médiate" I noticed that it bore the date 1819. The first issues of the book appeared in Paris in September of that year—just a hundred years ago. An editorial in The Journal of August 9 emphasizes this fact. Should there not be some general recognition of this anniversary by the American medical profession? The centenary of the stethoscope! It is at least an opportunity to acknowledge gracefully a part of the great regard we must feel for all France just now, and particularly, with us, for the members of the medical profession in France. If no general act can be accomplished, I would suggest that the various county societies have a Laënnec program early in their fall meetings.

Logan Clendening, Kansas City, Mo.
Instructor in Physical Diagnosis, University of Kansas School of Medicine.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

HEALTH STATUS AND HEALTH PECULIARITIES OF THE JEWISH RACE

To the Editor:—Please suggest a list of books, magazine articles, statistical data, etc., dealing with the question of health status and health peculiarities of the Jewish race in all countries. Any material dealing with the susceptibilities and tendencies to certain maladies is especially desired.

H. A. S., M.D., Pittsburgh.

ANSWER.—The following references may be consulted:

Feldman, W. M.: The Jewish Child, $4, New York: Bloch Publishing Company.
Fishberg, M.: The Jews: A Study of Race and Environment, $1.50, New York: Charles Scribner & Sons.
Brill, A. A.: Adjustment of Jews to the American Environment, *Mental Hygiene*, April, 1918.
Kreinermann, S.: Pulmonary Tuberculosis Among the Jews, *Cor.-Bl. f. schweiz. Aerzte*, Dec. 4, 1915; abstr. THE JOURNAL, Jan. 29, 1916, p. 387.
Hexter, M. B.: Tuberculosis Work Among Jews of Cincinnati, *Lancet-Clinic*, May 8, 1915.
Jews and Consumption, London Letter, THE JOURNAL, Sept. 12, 1914, p. 958.
Salaman, R. N.: Heredity and the Jew, *Eugenics Rev.* **3**: 187, 1911-1912; ibid. **4**: 91, 1912-1913.
Flinker, A.: Cretinism Among the Jews, *Wien klin. Wchnschr.*, Dec. 29, 1910.
Are Jews Immune to Pellagra? Correspondence, THE JOURNAL, Aug. 5, 1911, p. 496.

THE COEFFICIENT OF ROBUSTNESS

To the Editor:—What rule is to be applied to secure the coefficient of robustness?

H. AYUSO Y O'HORIBE, M.D., Merida, Mexico.

ANSWER.—Pignet, a French military surgeon, in the course of certain anthropologic studies on soldiers evolved an empirical standard of physical fitness or so-called coefficient of robustness which has been used to a great extent in Europe, especially for the purpose of determining the physique of soldiers. His formula is: $F = H - (C + W)$. H is height in centimeters, C the chest measurement in centimeters at greatest expiration, and W weight in kilograms. The larger the factor, the poorer the physique. When F is less than 10, a person is very strong; between 10 and 15, strong; between 15 and 20, good; 20 and 25, medium; 25 and 30, weak; above 30, very weak. In rare cases, F becomes negative.

An attempt was made by Capt. J. A. Black of the Royal Army Medical Corps to adapt Pignet's formula to English measurements with the following results: $F = (W + C) - H$. W is weight in pounds, C the chest measurement in inches at full inspiration, and H the height in inches. When F is over 120 a man is classed as very strong; between 110 and 120, strong; between 100 and 110, good; between 90 and 100, fair; between 80 and 90, weak; under 80, very weak.

Pignet's formula can, of course, serve as a basis of comparison, but it is far from being a definite standard.

ELIMINATION OF ANTS

To the Editor:—In THE JOURNAL, Aug. 2, 1919, Dr. Brandon of Essex, Mo., asks for an efficient device for the eradication of ants. Two years ago we conquered an invasion of ants, but found the "microscopic brain of the ant" for the time being fully as intelligent as Sir John Lubbock claimed in his interesting account of them. The successful repulsion of these Huns was not effected until we employed lime, whitewashing profusely and completely the walls, steps and sills where ingress could be made. The cellar floor was also liberally whitewashed, and food placed in uncontaminated receptacles on the whitewashed floor temporarily until the insects could be given a barrage of whitewash wherever they had been. We have had no trouble since, as we repeat the external whitewashing every spring; and as they no longer pass, they have evidently met their Verdun.

H. P. ASHE, M.D., Pittsburgh.

Per Capita Cost of Insanity.—The total cost of maintenance of insane patients in the state hospitals in the fiscal year 1917 was $43,926,888.88. The average per capita cost based on the average daily patient population was $207.28. The highest per capita cost, $306.97, was reported by the state of Maine; the lowest, $135.90 by the state of Virginia.—*State Hospital Quarterly*, Utica, N. Y., May, 1919.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ALASKA: Juneau, Sept. 2. Sec., Dr. L. P. Dawes, Juneau, Alaska.
ARIZONA: Phoenix, Oct. 7. Sec., Dr. Allen H. Williams, 219 Goodrich Bldg., Phoenix.
COLORADO: Denver, Oct. 7. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.
DISTRICT OF COLUMBIA: Washington, Oct. 14-16. Sec., Dr. Edgar P. Copeland, The Rockingham, Washington.
GEORGIA: Atlanta, Oct. 14-15. Sec., Dr. C. T. Nolan, Marietta.
HAWAII: Honolulu, Sept. 8-10. Sec., Dr. J. R. Judd, Honolulu, Hawaii.
IDAHO: Boise, Oct. 7. Hon. Robt. O. Jones, Commissioner of Law Enforcement, Boise.
ILLINOIS: Chicago, Sept. 22-25. Sec., Mr. Francis W. Shepardson, Capitol Bldg., Springfield.
IOWA: Des Moines, Sept. 16-18. Sec., Dr. Guilford H. Sumner.
KANSAS: Topeka, Oct. 14. Sec., Dr. H. A. Dykes, Lebanon.
MASSACHUSETTS: Boston, Sept. 9-11. Sec., Dr. Walter P. Bowers, State House, Boston, Mass.
MICHIGAN: Lansing, Oct. 14-16. Sec., Dr. B. D. Harison, 504 Washington Arcade, Detroit.
MINNESOTA: Minneapolis, Oct. 7-9. Sec., Dr. Thos. McDavitt, 741 Lowry Bldg., St. Paul.
MISSOURI: Kansas City, Oct. 7-9. Sec., Dr. Geo. H. Jones, State House, Jefferson City.
MONTANA: Helena, Oct. 7. Sec., Dr. S. A. Cooney, Power Bldg., Helena.
NEW HAMPSHIRE: Concord, Sept. 11-12. Sec., Dr. Chas. Duncan, Concord, New Hampshire.
NEW MEXICO: Santa Fe, Oct. 13-14. Sec., Dr. R. E. McBride, Las Cruces.
NEW YORK: Albany, Buffalo, New York and Syracuse, Sept. 16-19. Mr. Herbert J. Hamilton, Assistant, Professional Examinations, Albany.
OKLAHOMA: Oklahoma City, Oct. 7-8. Sec., Dr. J. J. Williams, Weatherford.
RHODE ISLAND: Providence, Oct. 2-3. Sec., Dr. B. U. Richards, State House, Providence.
UTAH: Salt Lake City, Oct. 6-7. Sec., Dr. G. F. Harding, Templeton Bldg., Salt Lake City.
WEST VIRGINIA: Charleston, Oct. 14. Sec., Dr. S. L. Jepson, Masonic Bldg., Charleston.
WYOMING: Cheyenne, Oct. 6-8. Sec., Dr. J. D. Shingle, Cheyenne.

Idaho April Examination

Hon. Robert O. Jones, commissioner of the Idaho Department of Law Enforcement, reports the written examination held at Boise, April 1-2, 1919. The examination covered 11 subjects and included 110 questions. An average of 75 per cent. was required to pass. Eleven candidates were examined, all of whom passed. Twelve candidates were licensed through reciprocity. The following colleges were represented:

College PASSED	Year Grad.	Per Cent.
Chicago Hospital College of Medicine	(1918)	77
Hering Medical College, Chicago	(1901)	78
Loyola University, Chicago	(1918)	77
Rush Medical College	(1880) 75, (1914) 78, (1917)	80, 83
Hospital College of Medicine, Louisville	(1892)	75
Medical School of Maine	(1897)	75
Eclectic Medical University, Kansas City, Mo.	(1914)	80
University of Cincinnati	(1916)	79

College LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
College of Medical Evangelists	(1918)	Washington
Leland Stanford Jr. University	(1917)	California
Denver and Gross College of Medicine	(1905)	Utah
Rush Medical College	(1903) Washington, (1914)	Wyoming
Keokuk Medical College	(1905)	Arizona
University of Louisville	(1910)	Wyoming
Kansas City Medical College	(1891)	Montana
University of Oregon	(1918) Washington, (1918, 2)	Oregon
Jefferson Medical College	(1891)	Utah

Utah April Examination

Dr. G. F. Harding, Secretary of the Utah State Board of Medical Examiners, reports the written examination held at Salt Lake City, April 7-8, 1919. The examination covered 19 subjects and included 100 questions. An average of 75 per cent. was required to pass. Six candidates were examined, all of whom passed. Four candidates were licensed through reciprocity. The following colleges were represented:

College PASSED	Year Grad.	Per Cent.
Rush Medical College	(1918) 87.4;* (1919)	87.8
Harvard University	(1916)	85.5
University of Nebraska	(1918)	84.5
Columbia University, College of Phys. & Surgs.	(1918)	81.7, 84.4

College	LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
Chicago Medical College		(1889)	Iowa
Marion-Sims College of Medicine		(1899)	Colorado
University of Tennessee		(1882)	S. Carolina
National University, Athens		(1897)	Illinois

* Granted M.B. Degree in 1918 after completing four year course; will receive M.D. after completing his intern year.

Arkansas May Examination

Dr. T. J. Stout, secretary of the Arkansas State Board of Medical Examiners, reports the written examination held at Little Rock, May 2, 1919. The examination covered 12 subjects and included 120 questions. An average of 75 per cent. was required to pass. Of the 33 candidates examined, 30 passed and 3 failed. Eighteen candidates were licensed through reciprocity. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
College of Phys. and Surgs. Little Rock		(1910)	76.6
Arkansas Industrial University		(1896)	82.6
University of Arkansas (1904) 85.1, (1906) 82.1, 82.7, (1908) 84, (1916) 84.8, (1919) 83.4, 84, 84.5, 85.2, 89.1, 92.4.			
Hospital College of Med., Louisville		(1903)	84.5
Tulane University		(1903) 82.4, (1918)	86.4
University of Maryland		(1917)	79.5
Hamline University		(1897)	75.1
Cornell University		(1906)	92
Meharry Medical College (1919) 75.6, 79.1, 80.4.			
University of the South		(1898)	85.7
University of Tennessee, College of Medicine (1918) 85.5, (1919) 82.5, 83.5, 90.5, 90.6, 91.			
Vanderbilt University		(1918)	82
	FAILED		
University of Arkansas		(1918)	70.1
Meharry Medical College		(1918)	68.3
Memphis Hospital Medical College		(1911)	70.8

College	LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
Howard University		(1909)	Texas
College of Physicians and Surgeons, Chicago		(1906)	Texas
Indiana University, School of Medicine		(1913)	Tennessee
University of Maryland		(1893)	Oklahoma
College of Physicians and Surgeons, Memphis		(1907)	Mississippi
Meharry Medical College		(1905) (1910) (1914) (1917) (1918)	Tennessee
Memphis Hospital Medical College		(1908) (1909) (1910, 2)	Texas Tennessee
University of Nashville		(1905)	Mississippi
Vanderbilt Univ. (1892) Oklahoma, (1896) Texas, (1917)			Tennessee

Hawaii May Examination

Dr. J. R. Judd, secretary of the Hawaii Board of Medical Examiners, reports the written examination held at Honolulu, May 5-8, 1919. The examination covered 8 subjects and included 64 questions. An average of 75 per cent. was required to pass. Of the 5 candidates examined, 2 passed and 3 failed. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
University of Illinois		(1914)	80.4
Tokyo Imperial University		(1910)	79.7
	FAILED		
University of Louisville		(1910)	73.4
Fort Worth School of Medicine		(1917)	74
Tokyo Imperial University		(1916)	61.6

Nevada May Examination

Dr. S. L. Lee, secretary of the Nevada State Board of Medical Examiners, reports the written examination held at Carson City, May 5-7, 1919. The examination covered 13 subjects and included 100 questions. An average of 75 per cent. was required to pass. Eight candidates were examined and passed. Four candidates were licensed through reciprocity. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
College of Medical Evangelists		(1917)	94
Boston University		(1917)	82
Kansas City University of Physicians and Surgeons		(1919)	81.2
Columbia University, College of Physicians and Surg.		(1905)	89.6
University of Buffalo		(1917)	83.7
Jefferson Medical College		(1916)	88.1
Tokyo Charity Hospital Special Med. School		(1907)	81.9
Trinity Medical College		(1885)	81.9

College	LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
Georgia College of Eclectic Medicine and Surgery		(1914)	Arkansas
Kentucky School of Medicine		(1906)	Penna.
Eclectic Medical University, Kansas City		(1905)	Texas
Albany Medical College		(1909)	Illinois

Book Notices

THE ELEMENTARY NERVOUS SYSTEM. By G. H. Parker, Sc. D., Professor of Zoology, Harvard University. Cloth. Price, $2.50 net. Pp. 229, with 53 illustrations. Philadelphia: J. B. Lippincott Company, 1919.

This volume, the second of a series of monographs on experimental biology by American investigators, includes an "extended discussion of only the simplest examples of the elementary nervous system" as Parker himself states in the opening sentence of the last chapter. The author shows that contractile tissue (as effectors in the form of muscle cells) appears before any form of nervous tissue. Subsequently, there is added a receptor or modified epithelial cell which influences the effector more quickly because it is more sensitive to the external stimuli (chiefly physical) which originally acted on the effector organ directly. It is a "trigger, so to speak, to discharge the underlying muscle, and judging from the quickness with which this discharge is accomplished as compared with that with which the independent effectors discharge, the efficiency of the new system is beyond doubt." To this receptor-effector system is added later on a third type of cell, situated between the receptor and effector, designated by Parker the protoneuron, the ancestor of the neuron of more complex types of animals. The nerve net is thus evolved. The migration inward of this nerve net with its diffuse transmission of impulses leads to the beginning of the adjustor organ (central nervous system) in that the transmitting fibers arrange themselves into tracts showing physiologic polarity of conduction. The protoneurons of the nerve net evolve into the neurons of the nervous system. The first and last chapters of the book outline admirably the author's conceptions and the morphologic and physiologic data which lend support to these views. The remaining twelve chapters present the evidence in great detail as obtained from anatomic studies and physiologic experiment from various types of invertebrates (sponges, coelenterates and ctenophores). Most readers, except specialists, will no doubt judge that the contents could have been incorporated in a volume half its size. This is due in great part to the development of the theme along historical lines. The most interesting example of the latter is the delightful account of the development of our knowledge concerning the structure of nerve, nerve cells and nerve nets (Chapter IX). The book is written in an admirable style.

THE NEW PHYSIOLOGY AND OTHER ADDRESSES. By J. S. Haldane, M.D., LL.D., F.R.S. Cloth. Price, $2.75 net. Pp. 156. Philadelphia: J. B. Lippincott Company, 1919

The six addresses discuss biologic knowledge in relation to other departments of knowledge. The main point emphasized and developed from various points of view is that biology is an independent science and not merely applied physics and chemistry. The titles of the addresses are: "The Relation of Physiology to Physics and Chemistry"; "The Place of Biology in Human Knowledge and Endeavor"; "The New Physiology"; "The Relation of Physiology to Medicine"; "The Theory of the Development by Natural Selection," and "Are Physical, Biological, and Psychological Categories Irriducible?" In the first address the main contention is that "in physiology, and biology generally, we are dealing with phenomena which, so far as our present knowledge goes, not only differ in complexity, but differ in kind from physical and chemical phenomena; and that the fundamental working hypothesis of physiology must differ correspondingly from those of physics and chemistry." In the second address it is pointed out that the hypothesis that living organisms exist as such, and that their structure and activities are the expression of their existence, has the same defects as other working hypotheses, but that it is necessary for the biologist, though inconsistent with physicochemical conception of the universe. The third address centers around the claim that the attempts to analyze living organisms into physical and chemical mechanisms is a colossal failure and concludes with an interesting statement of the relations of practical medicine to biologic as distinguished from mechanistic physiology. In the fourth address the relation of

physiology to medicine is discussed more fully, and stress is laid on the great need at present for basing the study of anatomy, physiology, pathology and pharmacology on "the distinctively biological conception of organic regulation." In the two remaining addresses the inadequacy of mechanistic explanations of life and its activities is canvassed with special reference to natural selection and psychology. The addresses are interesting and animating, and should be read widely by physicians because they tend to broaden the point of view and to prevent empiricism and stagnation.

THE ANATOMY OF THE PERIPHERAL NERVES. By A. Melville Paterson, M.D., F.R.C.S., Lieut. Colonel R. A. M. C., Assistant Inspector of Special Military Surgical Hospitals. Cloth. Price, $4.50. Pp. 165, with 64 illustrations. New York: Oxford University Press, 1919.

The percentage of peripheral nerve lesions among the casualties of the late war was so high that brief accounts of the anatomy, physiology and pathology of peripheral nerves fill a very important part in the present literature. In this book the author presents briefly the anatomy of the peripheral nerves for the use of students and surgeons, particularly for those engaged in military orthopedic work. The contents of the book consist of chapters on the anatomy of the peripheral nerves, the distribution of the spinal nerves, the sympathetic system, and the cranial nerves. It would have been better if some of the views of the author relative to regeneration and degeneration of nerves, in view of their unsettled nature, had been omitted from the text. It is by no means established that living fibers are found in the distal as well as the proximal portion of a divided nerve, and that new growing axons are derived from both of these portions. The author's statement relative to restoration of function following a section of a nerve and its immediate suture cannot withstand a critical analysis. Communications between the various nerves are described in a manner which permits one to understand the retention of power ordinarily supposed to be lost following the interruption of a particular nerve. As the book was intended primarily for surgeons in the military service, it would perhaps have added to its value to include in the description of the cranial nerves their relation to each other at the base of the skull. The original illustrations are very good, but the reproductions of illustrations from other sources could be improved. In general, the volume is a useful one to the readers for whom it was intended.

HEALTH EDUCATION IN RURAL SCHOOLS. By J. Mace Andress, Ph.D., Head of the Department of Psychology and Child Study, Boston Normal School. Cloth. Price, $1.60. Pp. 321, with illustrations. Boston: Houghton, Mifflin Company, 1919.

This book is intended primarily for teachers in rural schools, with a view to aiding them to present to their classes the elements of hygiene. The author, we are informed, was born in the country, attended rural schools, taught in rural schools, served as a member of the county board, and has been for several years an instructor in hygiene and child study in normal schools. With this excellent equipment he has prepared a book which is well worth while. It presents the elements of the subject in simple language, and follows each chapter with suggestive class exercises and a list of bibliographic references, which will enable those wishing further knowledge to find it. It is to be hoped that those interested in the administration of our rural schools will avail themselves of the opportunity offered them to improve hygiene and hygienic instruction through the use of this textbook.

CHEERIO! By Harold M. Hays, Major, M. C., U. S. A. Cloth. Price, $1.50 net. Pp. 291. New York: Alfred A. Knopf, 1919.

The war resulted in a flood of books relative to the experiences of men in the various services. Some half dozen books of medical experiences have already been noted in this department. All are of interest as showing the particular point of view of the authors. All have been marked by the cheerfulness with which the officers viewed the many hardships of their service. Major Hays' book reflects a cheerful disposition under adverse circumstances. He and his unit seem to have been looking for the brighter side of things. The book is a pleasantly reminiscent one.

Medicolegal

Mental Capacity Required to Transact Business

(*Sutcliffe v. Heatley* (*Mass.*), *122 N. E. R. 317*)

The Supreme Judicial Court of Massachusetts holds that a note and mortgage were void when they were signed by a woman who had been subject to epileptic fits for about ten years and her mind had become permanently impaired and she did not have sufficient mental strength to care properly for her property and to understand the effect of the mortgage and note, and derived no benefit from signing them, the entire proceeds going directly to her brother, through whose undue influence she was induced to sign them, though she had sufficient capacity to understand that she was signing a note and mortgage, and did so understand, but was not of sufficient capacity to realize the effect it might have on her estate and to judge of the wisdom or unwisdom of the transaction. The court says that the test in cases of this kind is whether the person executing the instrument had sufficient mental capacity to be capable of transacting the business. If she could not understand the nature and quality of the transaction or grasp its significance, then it was not the act of a person of sound mind. There may be intellectual weakness not amounting to lack of power to comprehend. But an inability to realize the true purport of the matter in hand is equivalent to mental incapacity. When this is established, then a contract is voidable. It is no defense that the other party acted fairly and without knowledge of the want of mental faculty or of any circumstances which ought to have put him on inquiry. This case came within this rule.

Misrepresentations by Applicants for Insurance

(*Myers v. Mutual Life Ins. Co. of New York* (*W. Va.*), *98 S. E. R. 424*)

The Supreme Court of Appeals of West Virginia, which distinguishes between representations and warranties, holds that, in determining whether or not an applicant for insurance has been treated by a physician so as to render voidable a policy of insurance issued to him on the representation that he has not been so treated, prescriptions for slight temporary ailments will not be considered; neither will such slight temporary ailments be taken into consideration in determining the truth or falsity of a representation as to diseases or maladies with which the insured may have been afflicted. But a policy of insurance, issued on an application therefor, in which the representation is made, in answer to a question asked, that the insured had not consulted or been treated by a physician within five years next preceding the making of the application, will be avoided at the instance of the insurer on a showing that the insured within that time had been treated for several consecutive months for a chronic malady with which he was then suffering. A policy of insurance will also be avoided at the instance of the insurer, when the insured, in answer to a question in his application for insurance, states that he has since childhood suffered only from certain named complaints, from which he has fully recovered, when the evidence shows that he was treated for several months at a long time subsequent to the complaints mentioned by him for a disease with which he was then suffering.

Correct Practice Relative to Expert Testimony

(*Commonwealth v. Russ* (*Mass.*), *122 N. E. R. 176*)

The Supreme Judicial Court of Massachusetts, in holding that, in this case, wherein it was an issue at the trial whether the death of the defendant's wife was due to strangulation or to hemorrhage, it was a subject about which expert testimony was competent, says that the correct practice as to the introduction of such testimony is well settled. The competency of an expert witness to testify to his opinion rests on unusual knowledge and extraordinary experience, superior to that of ordinary persons. The witness, being qualified in this particular, then may base his opinion on facts observed by himself or within his own knowledge and testified to by

himself, or on facts assumed in the questions put to him and supported either by admitted facts or by the testimony of other witnesses already given or to be given at the trial, or on facts derived partly from one source and partly from the other. It is not necessary in all cases that the facts be stated in the form of a hypothetic question, although this is generally permissible. When an opinion is sought on substantially uncontradicted testimony heard by the witness with or without personal observation on his part, the question may be asked on that express or implied assumption without reciting the testimony in the question.

When there is conflicting testimony, a witness, who has been present in court and heard it, may be asked if he has formed an opinion as to a material point, respecting which his skill gives him requisite qualification to express an opinion, based on that testimony or parts of it. If his answer is in the affirmative, then he may select and state the facts given in testimony which in his opinion, if true, are most significant and pertinent as aids in the formation of an opinion and to what conclusion his mind is led by the consideration of such facts.

In the trial of a criminal or other case, it is permissible to ask an expert witness if he has formed an opinion from his observations and examination and from testimony heard in court as to the point in issue about which he is qualified to give evidence. On answering in the affirmative he may be asked to state that opinion. The direct examination then may stop, leaving the other side to develop the reasons in whatever detail may be desired. The forms of question given in decided cases may not be exclusive of all others.

It is essential, however, that in giving testimony the expert witness should not undertake to pass on the truth of the fundamental hypothesis on which his opinion rests unless it is within his own observation and knowledge. He simply must assume those facts as the basis of his opinion. It is the province of the jury alone to decide whether those facts are established. If they are established in substance to the satisfaction of the jury, then and not until then can the value of the expert evidence be taken up by them. If such facts are not so established, then the jury does not reach at all the consideration of the expert testimony.

Manifestly an opinion not grounded either on facts observed by the witness or on facts assumed and specified in the question or on facts in evidence through other witnesses, but based on facts taken on the hearsay of others out of court and not in evidence and not put in the form of a supposition in the question, is not admissible in evidence. Such an opinion would or might well be founded on facts, the truth of which could not in the nature of things be established to the satisfaction of the jury because no competent evidence respecting them would be before the jury.

As to the order of introduction of evidence and the form of questions, much must be left to the discretion of the presiding judge.

An expert witness cannot fortify his opinion by putting in evidence incompetent facts.

Liability of Husband for Medical Services to Wife

(Ward v. Johnson (Ga.), 98 S. E. R. 405)

The Court of Appeals of Georgia, Division No. 2, in reversing a judgment of nonsuit, holds that, on the trial of a suit against a husband for medical services rendered by the plaintiff to the defendant's wife, evidence that before the date of the rendition of the services by the plaintiff, the defendant left the state as a fugitive from justice, carried his wife with him, and that she later returned to the former community and lived on land belonging to the husband, the husband still remaining away, does not necessarily demand the inference that the parties were living in a state of separation as husband and wife under such circumstances that the husband would not be liable for necessaries, such as medical services furnished by the plaintiff to the wife. Whether credit was extended to the husband or to the wife, and whether the parties were living in a state of separation as husband and wife and under such circumstances as would make him liable for necessaries furnished her, were questions for the jury.

Society Proceedings

COMING MEETINGS

American Assn. of Electro-Therap. & Radiol., Philadelphia, Sept. 9-12.
Am. Assn. of Obstetricians and Gynecologists, Cincinnati, Sept. 15-17.
American Roentgen Ray Society, Saratoga Springs, Sept. 3-6.
Colorado State Medical Society, Denver, Oct. 7-9.
Delaware State Medical Society, Dover, Oct. 13-14.
Indiana State Medical Assn., Indianapolis, Sept. 24-26.
Medical Society of the Missouri Valley, Des Moines, Sept. 18-19.
Pennsylvania State Medical Society, Harrisburg, Sept. 22-25.
Tri-State District Medical Society, Rockford, Ill., Sept. 1-4.
Utah State Medical Association, Salt Lake City, Sept. 9-10.
Vermont State Medical Society, Burlington, Oct. 9-10.
Washington State Medical Association, Spokane, Sept. 11-13.
Wisconsin State Medical Society, Milwaukee, Oct. 1-3.
Wyoming State Medical Society, Thermopolis, Sept. 10-11.

AMERICAN SOCIETY FOR CLINICAL INVESTIGATION

Annual Meeting held in Atlantic City, N. J., June 14, 1919

(Continued from page 639)

Blood Examinations of Trinitrotoluene Workers

DR. GEORGE R. MINOT, Boston: Two hundred and thirty-three essentially unselected individuals were studied. Red cell abnormalities were found to be very frequent. The most interesting abnormality was the frequent finding of fragmented or fragmenting red cells which have a definite histologic character. These cells appear to afford evidence of a rapid increased destruction of the red cells. Evidence shows that distinct increases of these cells are to be looked on as a significant sign of a considerable degree of poisoning; and probably when they occur in large numbers, they indicate some degree of toxic jaundice. Among other red cell abnormalities noted were the following: Polychromatophilia occurred in 83 per cent. of the cases, often to a marked degree. Howell-Jolly bodies, stippling and blasts were found, and increased numbers of reticulated red cells. The red cell count averaged in the mildest cases 4,500,000, and in the severest 3,800,000. It was found that there was usually a definite relationship between the total amount of red cell changes and the symptoms. Methemoglobin or some form of changed hemoglobin is apparent in these cases.

The white blood cells do not furnish as much information concerning the worker's condition as do the red cells. Slightly increased white cell counts were common. The observations showed that an individual may become distinctly and severely poisoned with a normal, or an absolute or relative increased, lymphocyte count, or with an increased or normal polymorphonuclear count. However lymphocytosis is to be looked on as an undesirable sign, but does not necessarily indicate that significant poisoning will occur or is occurring, except when there is a leukopenia. Slight eosinophilia (more than 5 per cent.) occurred in 10 per cent. of the cases. It was more common in cases with slight symptoms than in those with marked.

The blood platelets were usually slightly increased. Their diminution was observed twice and in both cases there was a relative lymphocytosis. Such a condition should certainly be regarded as evidence of a severe effect on the marrow, indicating aplasia. Webster's test for changed trinitrotoluene in the urine was found to be less valuable than blood examination to indicate the worker's condition.

Value of Urobilin and Urobilinogen of Stool and Urine in Diagnosis and Prognosis of Pernicious Anemia

DRS. G. H. HANSMANN and C. P. HOWARD, Iowa City: Our material consisted of twenty-seven cases of pernicious anemia and nine miscellaneous conditions. The method used was a modification of the Wilbur and Addis spectroscopic method described by J. D. Boyd. The evidence of abnormal hemolysis occurs first in the stools, secondly in the duodenal contents, and lastly in the urine. An increase of the urobilin and urobilinogen in the urine and stools above 12,000 dilutions is a constant finding in pernicious anemia during the period of remission. The presence of even small amounts of

urobilinogen in the urine is evidence of a probable pernicious anemia in the absence of signs of biliary or hepatic disease.

A low red cell count with a low urobilin and urobilinogen content indicates an arrest of the activity of the disease process, and that a period of improvement may be anticipated. On the other hand, a high red cell count with a high urobilin-urobilinogen content indicates a marked hemolysis and often precedes a steadily falling blood count, as was also demonstrated by McCrudden.

Active Immunity Against Experimental Pneumococcus Pneumonia

DRS. RUSSELL L. CECIL and FRANCIS G. BLAKE, Washington, D. C.: The production experimentally of typical lobar pneumonia in monkeys affords an ideal method of testing the value of various pneumococcus vaccines. The injection of killed cultures of pneumococcus into ordinary laboratory animals will protect them against lethal doses of virulent pneumococci injected intravenously; but this is not equivalent to preventing the disease itself. An equally efficient immunity exists in monkeys following an attack of experimental pneumococcus pneumonia. This immunity appears to be similar in all respects to that following vaccination with a living culture. It has been found possible to produce lobar pneumonia in monkeys by the intratracheal inoculation of minute amounts of pneumococcus culture. The disease produced is entirely comparable to lobar pneumonia as seen in man both in its clinical and in its pathologic features. The opportunity presented to study the histogenesis of lobar pneumonia from the earliest stages of invasion of the lung by the pneumococcus to beginning resolution has brought out some interesting facts. The pneumococci primarily penetrate the mucous membrane of the larger bronchi near the central portion of the lung and there set up an inflammation of the perivascular and peribronchial tissue as shown by infiltration with polymorphonuclear leukocytes and edema. The process advances by direct extension to the adjacent alveolar walls and by way of the lymphatics toward the periphery of the lung, being at first entirely interstitial in character before actual exudation into the alveolar spaces has occurred. Consolidation subsequently occurs by the pouring out of the exudate into the alveolar spaces, at first serous and then cellular, until complete hepatization of one or more lobes has occurred.

DISCUSSION

DR. FRANCIS G. BLAKE, Washington, D. C.: The perivascular infiltration and interstitial character of the process in the early stages of lobar pneumonia as seen in monkeys, either killed or dying soon after inoculation, is not commonly seen in man because men do not die sufficiently early in the disease for this feature of the pathologic condition to be at all prominent. It is in many respects comparable to the early stages of pneumococcus pneumonia following influenza except so far as the picture has been modified by the preceding or concomitant influenzal infection.

DR. S. J. MELTZER, New York: In the course of last winter, Wollstein and I again carried out a large series of experiments in the production of pneumonia in dogs by the method of insufflation. The insufflated dogs either died within twenty-four hours or after from six to ten days with characteristic clinical symptoms. Some dogs temporarily recovered from the disease to die or to be killed later. The pathologic pictures revealed at the various necropsies manifold lesions, depending on the degree of the virulence of the culture, on the quantity insufflated, and on the time of the year when the experiment was conducted.

Bone Marrow Changes in Mustard Gas Poisoning

DR. E. B. KRUMBHAAR, Philadelphia: When yellow cross gas (mustard gas) was first used against the Allies in July, 1917, we found that an extraordinary leukopenia developed in the severe cases, often reaching less than 1,000 cells per cubic millimeter. This leukopenia (chiefly due to diminution in the polymorphonuclears and disappearance of eosinophils) followed an initial leukocytosis and reached its climax during the second week after gassing, at the time when the mortality curve was highest. It was therefore thought that the lack of leukocytes in the circulating blood might have an important bearing on the lack of resistance to secondary infections that was shown by such cases. A study of the bone marrow in fifty-five fatal cases showed an inhibition of the blood regenerative process, which, as it occurred both in the absence of infection and in the presence of pyogenic infection, was taken to be due to a directly toxic action of the poison on the bone marrow. Fourteen marrows showed an almost complete aplasia, and twenty-eight a very slight and thirteen a moderate hyperplasia, but in none was hematopoiesis as active as in marrows from such acute infections as pneumonia, meningitis, typhoid and influenza. The cellular constituents of the hematopietic areas also emphasized the inadequacy of the attempts at regeneration. Immature forms were most prominent, together with fair numbers of phagocytes and pigment indicators of increased blood destruction. Blast forms were uncommon, but polymorphonuclears were even rarer, and in some cases almost entirely absent. In the case of those patients who died after the second week, when leukopenia no longer existed, hyperplasia of the marrow was more marked, and polymorphonuclears and normoblasts were more in evidence.

(*To be continued*)

ASSOCIATION OF AMERICAN PHYSICIANS

Thirty-Fourth Annual Meeting, held at Atlantic City, N. J., June 16-18, 1919

(*Concluded from page 637*)

Experiments with Cultures of Streptococci, with Special Reference to Empyema

DR. F. P. GAY, Berkeley, Calif.: I succeeded in producing empyema in the rabbit by injection of a streptococcus culture into the pleural cavity; I have not succeeded in producing empyema by introduction through the respiratory tract. The cultures which will produce empyema will not produce septicemia; the organisms remain in the circulation for three or four days, but the animal does not die. The culture will not produce peritonitis. Vaccines such as are used in the vaccination of human beings have had no effect in preventing this empyema. Experimental animals are rendered more susceptible, except in cases of long continued inoculation for six weeks or more, when it becomes immune; but no serum or vaccine capable of curing the animal of empyema has been obtained.

New Method for Testing Immunity by Means of the Whole Blood, with Especial Reference to Pneumonia and Its Prophylaxis by Bacterination

DRS. S. S. COHEN and G. H. HEIST, Philadelphia: We wished to know whether certain drugs modified the development of the disease; also, whether the existence of natural or artificial immunity in men or animals can be demonstrated by a better or simpler method than agglutination, and whether the existence of protective substances in the blood, or recovery without their development, can be demonstrated after certain prophylactic or therapeutic measures. The results with serum, defibrinated blood and citrated blood were inconstant and contradictory. Remembering an observation of Wright's which, however, he had not published, namely, that the whole blood of immunized animals, as it flowed from the vein, killed pneumococci, we tried to develop a simple and workable way of testing this germicidal power of the whole, unaltered, flowing blood, in which only a small quantity of blood need be used, and the manipulations can be completed before coagulation began. The solution of the problem came from Prof. B. F. Lacy, of the department of physics of the Central High School of Philadelphia, and the technic was worked out by Dr. Heist. It is therefore termed the "Lacy-Heist" method. A capillary glass tube is filled up to a mark with broth culture of pneumococci and then emptied of fluid by touching its tip to a piece of moist gauze. A film containing a certain number of pneumococci remains sticking to the wall of the tube. Blood as it came from the capillary or vein was allowed to flow up the seeded tube to

the mark; and it was then sealed and incubated for twenty-four hours at 37 C., when a drop was blown on a slide and stained. By using a multiple fan shaped pipet, such as Wright used for coagulation, several dilutions of the culture in multiples of five or ten might be used and an approximately quantitative result obtained. If the blood had no bactericidal action, the pneumococci multiplied freely. If it was bactericidal, they were killed and no growth resulted. The reaction was sharp—either there was abundant growth, or the bacteria were killed, as shown by the absence of colonies on centrifugalization and plating. This test gave constant results. Pigeons are naturally immune to pneumococcal infections. Their blood destroyed virulent cultures that flourished in mouse and rabbit blood. On the other hand, the blood of mice and rabbits suitably immunized destroyed the cultures. No bacterial action resulted from the serum of the defibrinated blood either of the naturally immune pigeon or the inoculated rabbit. Similar observations were made on human blood, showing some men to be naturally immune, others to be susceptible, and others to have acquired immunity by inoculation or by recovery from pneumonia. Cultures that failed to grow in unimmunized rabbits' blood proved to have lost their virulence. The animals survived large doses. When the virulence was restored by passage through mice and rabbits, the bacteria grew in the capillary tubes. The living culture killed the animal. Such cultures were used as tests for immunity. After inoculation with killed pneumococci by a special method of preparing the vaccine, Dr. Heist was able to produce immunity to Type III as well as to Types I and II and to demonstrate this immunity by the method here described. Even when agglutination tests failed or as in Type III were inapplicable, tests were made with other organisms, pathogenic and nonpathogenic, including *B. subtilis*, meningococci, and the globoid bodies of poliomyelitis. We concluded from these uniform results that bacteria which would not grow in the whole blood of an animal or man were nonpathogenic for that species or individual, while those that did so grow were pathogenic. We concluded, likewise, that in both natural and artificial immunity there is in the whole blood a protective force or quality not to be found in any fraction of it. We do not know what this is, nor do we know that it is the same in the two instances. Very probably it is not.

Rapidity and Persistance of Action of Digitalis on the Heart

Dr. G. Canby Robinson, St. Louis: A study of digitalis was made on patients suffering from a form of cardiac disorder which is so influenced by digitalis that it could be determined definitely when the drug begins to take effect, and in most cases when its action ceases. Digitalis was usually administered in one large dose in the form of the tincture which had been assayed by the cat method of Hatcher and Brodie, and was given by mouth. The dose was determined by the method described by Eggleston, and 0.15 c.c. was given per pound of body weight. In a few instances this dose was reduced on account of certain clinical findings. Twenty-six cases were studied and tabulated. The maximum effect of digitalis, as judged by the slowest ventricular rate, was usually observed in from fifteen to twenty-six hours. In thirteen cases the heart remained under the influence of digitalis from four to twenty-two days, or an average of nine days and eight hours. In one case the effect lasted only one day, while in the others no definite statement is justified, because subsequent doses of the drug were given before the effect of the first dose had disappeared or, as in one case, the patient died. The study of these cases demonstrates that a single large dose of the tincture of digitalis given by mouth affects the heart soon after administration, and at relatively uniform time, indicating that the drug is well absorbed, at a uniform rate. It also demonstrates that the maximum effect is usually obtained in about twenty-four hours and generally continues to be effectual for nearly ten days.

Thrombosis of Coronary Arteries

Dr. Emanuel Libman, New York: The term "angina pectoris" should be dropped and replaced by "cardiac pain." The most common causes of pain in the cardiac area are: (1) hypertension with dilatation of the arch of the aorta with or without narrowing of the arch; (2) Hodgkin's disease; (3) syphilis of any part of the vascular system, and (4) disease of the coronary arteries. The usual sequence of events in cases of coronary thrombosis is, first, the closure of the artery; second, the infarction of the artery; and then a later period in which there is cardiac pain and, perhaps, rupture of the heart. Infarction can be diagnosed by the active pericarditis, but the infarction may be in the back of the heart. In thrombosis, a valuable sign is leukocytosis. A hint is given by feeling other arteries in the body; the patient may have had intermittent claudication. Search the history for evidence of ptomain poisoning, and whether after recovery the patient had difficulty in walking. Another symptom of thrombosis of the coronary arteries is a peculiar leaden tint, although not every patient develops this color. In thrombosis of the right coronary artery there is apt to be acute enlargement of the liver.

Early Diagnosis of Intestinal Tuberculosis

Drs. Lawrason Brown and H. L. Sampson, Saranac Lake, N. Y.: Ulcerative peritonitis is difficult to diagnose clinically. A patient with a lung lesion who complained of indigestion and constipation, with long persistent elevation of temperature, was found to have a tuberculous colitis. A study of the roentgenograms showed the barium located in the cecum. Of seven cases of ulcerative colitis examined, in six there wa tuberculous colitis. The diagnosis was founded on hypermotility of the tract, as shown by the roentgen ray, and filling defects which were interpreted as spasm. One patient had tuberculosis of the hepatic flexure with a membrane at that point. Often it was noted that when the barium had been evacuated at the end of twenty-four hours, there remained an ileac stasis, in which the barium did not pass the ileocecal valve. In almost every case there was spasm of the cecum. Pain, nervous diarrhea, and gas are prominent symptoms in these cases, which are often difficult of diagnosis, but which may be benefited by operation.

A Case of Ayerza's Disease (Chronic Cyanosis, Chronic Dyspnea, Erythremia, Enlargement of the Liver and Spleen and Hyperplasia of Bone Marrow) Associated with Syphilific Sclerosis of the Pulmonary Artery

Dr. A. S. Warthin, Ann Arbor, Mich.: This is a case of chronic cyanosis, dyspnea and erythremia, observed clinically over a space of five years. It was at first supposed to be one of mediastinal tumor, as the roentgen ray disclosed a large, well marked shadow above the heart. This did not increase in size. The patient was a laborer. He showed chronic cyanosis and polycythemia. The red blood count was from 7 to 8 million cells. Later the case was recognized as one of Osler-Vaquez disease. The clinical course was characterized by attacks of angina, hypercyanotica, cyanosis, increasing weakness, drowsiness, edema, asthma, dyspnea, enlargement of the spleen and liver, multiple telangiectasis, and constant erythremia. The man was fairly comfortable for some time but finally developed large spleen and liver, and very marked somnolence, which was in accord with the Spanish description of the disease.

At the postmortem examination the findings were: extreme atherosclerosis of the pulmonary artery and all its branches, extreme dilatation of the right heart, fibrosis and emphysema of the lungs, extreme angiectasia of the entire vascular system, enlargement of the liver and spleen, and hyperplasia of the bone marrow. The microscopic examination revealed the presence of a typical syphilitic mesarteritis of the pulmonary artery and aorta, chronic fibroid myocarditis, pancreatitis, orchitis, leptomeningitis, suprarenal infiltration of plasma cells, and also changes in the stomach wall of a syphilitic character.

Cancer of Pancreas

Dr. T. B. Futcher, Baltimore: Fifty-eight cases have been noted among 41,000 patients admitted at the Johns Hopkins Hospital. We studied thirty cases in which the diagnosis

was confirmed by exploratory operation or by necropsy. Twenty-one were in males, nine in females. Most of the patients were in the fifth decade of life. Pain was a prominent symptom in all but six cases, and was located in the upper section of the abdomen. Jaundice was the most constant symptom. This was pregressive, persistent and intense. One patient was almost black and had the appearance of argyria. A palpable tumor was present in twelve cases, in the apex of the epigastrium; this did not descend on deep inspiration. A distended gallbladder seemed to be an important diagnostic physical sign, and was different from the blocking of the common duct by stone, which did not cause distention of the gallbladder. In nearly all cases there was enlargement of the liver due to jaundice, but this lacked the features of ordinary catarrhal jaundice. This was sometimes due to lack of function of the pancreas, and acholic stools were noted with excess of fat. Such stools were present in twenty-two out of thirty cases. In two there was actual fatty diarrhea with from twelve to fourteen large, fatty, white stools in twenty-four hours, due to the growth's shutting off the pancreatic ferment from the intestinal tract. Glycosuria was present in 10 per cent. of the cases. The tumor was usually situated at the head of the pancreas; one was in the body. Eight were primary cases; two were secondary to carcinoma of the stomach and gallbladder, respectively. These were adenocarcinomas. There was one case of hemangioma endothelioma.

A New Roentgen-Ray Sign of Perinephritic Abscess

DRS. H. M. FUSSELL and H. K. PANCOAST, Philadelphia: A wavy appearance of the diaphragm on fluoroscopic examination is a valuable diagnostic sign in early detection of perinephritic abscess.

AMERICAN ORTHOPEDIC ASSOCIATION

Thirty-Third Annual Meeting, Atlantic City, N. J., June 14-17, 1919

(*Continued from page 635*)

Operative Treatment of Paralytic Conditions of the Upper Extremity

DR. ARTHUR STEINDLER, Iowa City: Essential requirements for function of the upper extremity are: active abduction, or apposition of abduction of shoulder; ability of flexion of elbow; ability of pronation of forearm; hyperextension of wrist, either active or passive; active flexion of the metacarpophalangeal joints; free play of the fingers and power of opposing the thumb to the fingers. In flail shoulder there does not seem to be any reliable method of tendon transplantation. The indication here seems to be arthrodesis; this need not be complete, however. The problem of flail elbow is difficult as the arthrodesis cannot be undertaken in children under 14 or 15 years of age. Even then it is doubtful. Operation consists in causing the flexors and extensors of the wrist to act as flexors of the elbow; but flexion is limited and is of use only when the muscles are not weakened. A plaster cast is used for two months, and then a splint with a stop lock for six months, not more than 90 degrees of extension being allowed. In drop hand and flail wrist, stabilization of the wrist is an advantageous procedure. The result of the operation is not a complete arthrodesis, but rather limited wrist motion, from 10 to 30 degrees of extension. Tendon transplantation is done in addition in several cases. The operation of flexorplasty is done with advantage in restoring opposition of the thumb and thus the function of the hand. This operation is often performed in addition to other work on the hand and forearm. Lack of extension of the thumb is corrected by the method of Mayer and Biesalski, by taking the extensor of the index finger as a check to the flexors of the thumb. For flexion of wrist in "main-en-griffe" flexorplasty is done in some cases, and the cock-up splint, of the kind devised by Sir Robert Jones, is used in other cases. Flexorplasty of the elbow combined with arthrodesis of the shoulder, gave better functional results than in cases in which arthrodesis of the shoulder was not done. If arthrodesis of the wrist had been carried out in connection with elbowplasty, the elbow results would have been better.

DISCUSSION

DR. CLARENCE L. STARR, Toronto: We are now studying results on from 450 to 500 cases of nerve suture, after nerve separation from scar, and are attempting to find out what we have succeeded in doing. The results are very interesting. Early cases were those of bullet wounds and machine gun wounds, which generally healed within two weeks, but left complete separation of the nerve. In these, operation was performed early, and these have formed a large percentage of complete recoveries and restoration. In other cases that were supposed to be septic and in which the patients were brought home for treatment from eighteen months or two years after the injury there has been a very small percentage of recovery, so that they are almost hopeless. One has to choose the best time to operate. Dr. Kidner said that a large percentage of these men would recover if left alone, but many of them will not come anywhere near approximation, even if left till the crack of doom. Tennell's sign is a good one, but it is not reliable. Operation should not be delayed when it is found that the muscle power is going down, as tested by faradic and galvanic stimulation. Operation done under these indications usually shows what is expected. I have never seen a satisfactory case of nerve bridging, with ultimate recovery. One can get recovery in nerves with purely motor function like the musculospiral and the sciatic. It seems occasionally as if there were rotation of the nerve and that the axis cylinders find their way from motor areas to sensory areas. A piece of shrapnel may twist a nerve a number of times, and it is almost impossible to get approximation of the proper fibers. Best recoveries have been seen in the sciatic, the median and the musculospiral. In the upper extremity one has a good substitute in muscle transplantation, particularly in the musculospiral, in which one only has to overcome gravity. There is almost enough power to use the flexor tendons of the forearm and thumb, the wrist next and the fingers last. With a musculospiral injury one can transplant muscles and make a useful hand. The pronator radii teres can be taken from its insertion and inserted into the wrist, the pollicis longus can be transferred to the flexor of the thumb, the flexor carpi radialis to the extensors of the fingers. Tendon transplantation has been so satisfactory that one does not feel bad if the musculospiral is separated.

DR. CHARLES BAGLEY, JR., Baltimore: Considerable experience is necessary before one can interpret the action of the muscles. Often there is simulated action. The time element does not need consideration, but all cases without improvement need operation. The Tennell sign is merely additional evidence; one cannot depend greatly on it. Operation is not done till the wound is healed completely, and sometimes, while one is waiting for operation, the nerve has started to regenerate. After liberation of the nerve, and no sign of return of function, or in cases in which the nerve is tied up with scar tissue, or perhaps neuroma, it is better to do an end to end suture. Sometimes too much tension makes reoperation necessary. If nerve suture is done under favorable conditions, reoperation is not justified. The ideal time for operation would be when the wound had just healed. In cases in which circulation has been much interfered with, on account of extensive *débridement*, one is puzzled as to whether or not to free the nerve from scars, as this might interfere still further with circulation and make amputation necessary.

DR. SIDNEY M. CONE, Baltimore: Some things have perhaps been said too emphatically, for instance, Starr's statement that one cannot have a graft of nerve toward the periphery, when there is a large gap, as there is no connecting link between the two. There is much good clinical and laboratory work which refutes that statement. I believe that there are other methods of nerve growth than those actually seen, that is, from the central end. Even the most hopeful workers in clinical and laboratory study cannot say definitely whether growth is continuous or whether it takes place by effusion. I have no doubt that the proximal end, surrounded by Schwann's sheath cells, has a better chance to grow. I think also that nerve formation may take place in the distal ends of the scar formation of Déjerine. There is good rea-

son why there should be more growth from the proximal end than from the trophic center. How, then, does the nerve find its way to the periphery? There are a number of questions in diagnosis, such as the character of the wound, the character of the muscle, the duration of the wound, the health of the individual, the time of year, the position of the patient when struck, nerve growth, and protein changes in the wound. The physiology of scar formation has to be considered, and infections of various kinds, the degrees of which have not been well studied. Probably nerves caught in a cellular embryonic state may produce growth which simulates growth by first intention. Growth under pathologic conditions may be a different question. Often nerves have been seen showing wild growth through the sheath after operation. Scar tissue, however, prevents this. Even with foreign bodies, symmetrical nerve bulbs are seen, growing quite close up to the foreign body. There is also the question of the blood supply to the nerve. In cases in which the musculospiral and ulnar nerves have been completely separated for months, the amputated arm was studied, and a suggestion of growth of new nerve was found down to the wrist, not complete, but a suggestion of an attempt to form new nerve all the way along and some adult nerve with funnels.

Dr. Frederick C. Kidner, Detroit: The operative side of nerve surgery has been condemned unnecessarily. It is not necessary to wait long periods of time before operating on nerves. Usually it is safe to operate early by a two-stage method. One can go in within from two to three weeks after the skin has closed and find out what the condition is surrounding the nerves. Then one can close up and watch for sepsis, and if none appears, finish the operation. That will save the patient from six to nine months of waiting. The preliminary operation does not do any harm. Badly damaged nerves do not need operative interference except removal of bands of scar tissue. Badly chewed up nerves recover surprisingly well. For severed nerves, the earlier suture is done the better the prognosis. It is almost impossible to tell whether the nerve is severed or not. By waiting to find out, time is wasted. The simpler the operation the better. One sometimes finds cases of interposed foreign body, muscle or membrane actually preventing the union of nerve. This should be removed, and the ends brought together in an easy position with the finest silk suture. It is then replaced in the best bed it is possible to find, with relaxation of the suture line by the joints in the neighborhood. It is better to wait for nerve recovery rather than do tendon transplantation. This gives good results for four or five months, then stretches, and leaves the patient unimproved. In injuries of the musculospiral, the hand adapts itself and becomes a useful hand, so that it hardly seems necessary to perform complicated and difficult operations. When one is in doubt about division of the nerve, it is useless to wait and prove the interruption; it is better to operate as soon as active sepsis has ceased. If there is any fibrous continuity whatever, one should wait two or three years; time and again such patients have recovered. If there is any fibrous continuity, the nerve would push through. Often at operation one can get a strong electrical response from tissue which looks like nothing but scar tissue, which proves that there are nerve fibers coming through. Even if there is no electrical reaction it is well to err on the safe side. In case of a gap in which end to end suture is impossible, one can perform a spinal laminectomy and tip up the joint. Grafting is the last resort.

Dr. J. Torrence Rugh, Philadelphia: Splints with pressure should be applied extremely carefully. The dorsum of the fingers will not stand pressure.

Dr. E. W. Ryerson, Chicago: It is interesting to know whether any forms of filling in nerve gaps will succeed. Professor Huber seems to think that planting the sciatic of the calf will succeed in certain cases. Might it not be a good plan to adopt the policy of the French, and shorten the two bones of the forearm?

Dr. H. P. H. Galloway, Winnipeg, Manit.: I can speak enthusiastically of tendon transplantation in those cases of musculospiral paralysis in which there is no hope whatever of restoring power to the muscles.

(*To be continued*)

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Physiology, Baltimore

Aug. 1, 1919, **49**, No. 3

*Studies in Secondary Traumatic Shock. III. Circulatory Failure Due to Epinephrin. J. Erlanger and H. S. Gasser, St. Louis.—p. 345
*Physiologic Studies on Planaria. I. Oxygen Consumption in Relation to Feeding and Starvation. L. H. Hyman, Chicago.—p. 377.
Susceptibility to Lack of Oxygen During Starvation in Planaria. C. M. Child, Chicago.—p. 403.
Quantitative Studies on Rate of Respiratory Metabolism in Planaria. II. Rate of Oxygen Consumption During Starvation, Feeding, Growth and Regeneration in Relation to Method of Susceptibility to Potassium Cyanid as a Measure of Rate of Metabolism. G. E. Allen, Minneapolis.—p. 420.
Experimental Studies on Ureter. Y. Satani, Baltimore.—p. 474.

Circulatory Failure Due to Epinephrin.—The experiments reported by Erlanger and Gasser show that the injection of epinephrin for a period of from twenty to thirty minutes at such a rate as to maintain a high arterial pressure invariably constricts the arteries of both the somatic and the splanchnic areas. With large doses this constriction may be maximal and outlasts the injection period, it may be, for as long as two hours. This continued constriction is partly due to central action. After sufficiently large doses, the arterial pressure, barring occasional intercurrent phenomena, fall steadily and slowly until the animal dies. The jugular pressure, during or after large injections shows no constant alteration, at least not of a kind that indicates inefficiency of the heart. The heart may become irregular for a while and occasionally stop suddenly while the arterial pressure still is high. The respiration after large doses often is slowed and may suddenly or gradually fail. The portal pressure is increased, often markedly, during their injection, and may remain high subsequently; but not uncommonly it soon returns to the normal level. Evidence is presented indicating that accumulation of blood in the portal area as a result of the increased portal hepatic resistance is not in itself the cause of the failure of the circulation. The failure of the circulation is rather to be attributed to the extreme slowing of the blood flow throughout the body caused by the constricting action of the epinephrin of the arteries. It is concluded that the cause of the failure is the same as is operative after temporary partial obstruction of the vena cava or of the aorta.

Oxygen Consumption in Feeding and Starvation.—The results of Hyman's observation on planaria are applicable to other organisms also. He found that starvation increases the metabolic rate of organisms, and that starved organisms are metabolically in a condition similar to that of young organisms.

American Journal of Syphilis, St. Louis

July, 1919, **3**, No. 3

*Intraspinal Therapy in Neurosyphilis. J. A. Fordyce, New York.—p. 337.
*Syphilis of Digestive Tract. T. R. Brown, and E. H. Gaither, Baltimore.—p. 376.
Syphilis in Negro. L. Thompson, Hot Springs, Ark., and L. B. Kingery, Ann Arbor, Mich.—p. 384.
*Pneumonias Following Injections of Arsenobenzol. O. M. Schwerdtfeger, and M. B. Tinker, Ithaca, N. Y.—p. 398.
Comment on Article of Majors Schwerdtfeger and Tinker on "Pneumonias Following Injections of Arsenobenzol." J. F. Schamberg, Philadelphia.—p. 404.
Standardization of Wassermann Reaction. IV. General Study of Complements of Various Animals with Special Reference to Human and Guinea-Pig Complements and Methods of Collection. J. A. Kolmer, T. Matsunami and M. E. Trist, Philadelphia.—p. 407.
Intensive Treatment of Women with Arsenobenzol (Schamberg). Procedure and Results at Hospital Jail, San Juan, P. R. H. Goodman, New York.—p. 449.
Case of Anal Chancre Resulting from Pederasty. C. H. Marshall, Ann Arbor.—p. 454.

Intraspinal Therapy in Neurosyphilis.—Fordyce emphasizes again that the results following the treatment of syphilis are largely dependent on the age of the infection. For this

reason the importance of early diagnosis and energetic treatment has been emphasized. A serologic cure in cases of syphilis in the late secondary stage and following this is difficult to obtain and requires expert knowledge in the use of therapeutic agents. When the central nervous system is invaded the problem is complicated by the highly organized nature of the tissues, the results of secondary degenerations and the inaccessibility of the spirochetes in certain types of neurosyphilis. Success or failure in the use of intraspinal therapy depends on the technic employed and the persistence of the physician in carrying it out. Above all, it depends on the cytobiologic indications which are present in the spinal fluid for initiating or persisting in this mode of therapy. The order in which the various reactions disappear is indicated by Fordyce. The cytology is usually the first phase to be influenced in persistent infections. In some cases treatment must be continued for from one to two years before a definite impression is made on the globulin content or the Wassermann reaction. Modification in the intensity of the globulin reaction is usually followed by a weakening in the strength of the Wassermann reaction and by a change in the colloidal gold reaction. Rapid changes in the Wassermann reaction when strongly positive in the high dilutions, in Fordyce's experience, do not occur except in cases of early syphilitic meningitis. In old cases of neurosyphilis a gradual diminution in the intensity of the Wassermann reaction is of good prognostic import, and when it finally became negative Foreyce has reexamined patients after one, two, and three years who have shown no return of any of the previous phases.

Syphilis of Digestive Tract.—Syphilis plays a very much more important rôle in gastro-intestinal pathology, according to Brown and Gaither, than is usually supposed. They are convinced that if such possibilities are thought of, if the history is taken carefully, if the physical examination is complete, with, of course, careful study of blood or even of spinal fluid, if indicated—that an increasing number of gastro-intestinal lesions regarded as due to other causes, will, in reality, be shown to be syphilitic in origin.

Pneumonias Following Injection of Arsenobenzol.—Nine patients who had syphilis were injected with exactly the same solution and technic, each having an immediate reaction which was followed by a bronchopneumonia. All patients were critically ill, extreme dyspnea being the outstanding feature. The recovery was complete in each case.

Archives of Internal Medicine, Chicago

Aug. 15, 1919, **24**, No. 2

*Immunity of City Bred Recruits. A. G. Love and C. B. Davenport, Washington, D. C.—p. 129.
*Pathologic Anatomy and Bacteriology of Influenza, Epidemic of Autumn, 1918. B. Lucke, Philadelphia, T. Wight, Santa Monica, Calif., E. Kime, Indianapolis.—p. 154.
*Incidence of Pulmonary Tuberculosis in Soldiers with Irritable Heart. J. T. King, Baltimore.—p. 238.
*Increase of Extract Nitrogen in Tissues, with Chronic Nephritis. N. B. Foster, New York.—p. 242.

Immunity in City Bred Recruits.—In mobilization camps, communicable diseases have produced the least admission and death rate in those camps which drew from areas that were prevailingly urban. Love and Davenport base this conclusion on the studies made of measles, mumps, lobar pneumonia, cerebrospinal meningitis, scarlet fever and influenza. The explanation given of this relation is that recruits from prevailingly urban territory had acquired immunity through having had the disease in their youth. However, this hypothesis does not cover the case of the rarer diseases of childhood, such as cerebrospinal meningitis. Another hypothesis is that the immunity is due to a selective elimination of susceptibles. It is assumed to be greater in densely populated than in sparsely populated areas. This hypothesis fails, however, to account for immunity in the case of mumps which does not kill children. Another hypothesis is that life in urban communities produces a general resistance to disease of which the observed resistance to measles, mumps, lobar pneumonia, cerebrospinal meningitis and scarlet fever are only special instances. Many collateral facts speak strongly for this hypothesis.

Influenza.—Both the length and detail of this article preclude a brief abstract. However, a few of the authors' findings may be emphasized. For instance: The incidence of influenza is greater among whites than among negroes, but the mortality rate is higher among the latter. The anatomic and bacteriologic findings vary with the stage of the epidemic and of the disease and depend to a certain extent on the endemic bacterial flora. Influenza produces widespread changes throughout the body, and while the lungs commonly present the most spectacular lesions, pronounced alterations are also encountered in the nervous, cardiovascular and other systems. The most general changes produced by influenza are pronounced congestions, hemorrhages, toxic degenerative lesions and hemorrhagic inflammations. The true pneumonitis of influenza is characterized by extreme proliferation of pulmonary epithelium, pronounced hyperemia and hemorrhages. The commonly present secondary invaders produce a pneumonitis which grossly and microscopically consists of a number of separate, dissimilar pathologic processes. Throughout the disease there is a relative paucity of polymorphonuclear leukocytes and a proliferation of the lymphoid tissue; this would seem to point to myeloid intoxication and to lymphoid stimulation. Chronic influenza is characterized by relative absence of vascular changes, connective tissue proliferation and diffuse suppuration. The influenza bacillus, although not found in every one of the 126 cases analyzed was present in a sufficiently high percentage, and often enough in acute fatally ending infections, for the authors to consider it, if not the prime cause, at least the most important indicator of epidemic influenza. As the patients lived longer and the epidemic progressed, bacterial agents, well established as the cause of respiratory tract disease, notably the nonhemolytic streptococcus and pneumococcus, appeared as secondary invaders and modified the bacterial readings and anatomic changes. It is noteworthy that all the secondary invaders were more fatal in symbiosis than alone. Later in the epidemic the hemolytic streptococcus assumed the ascendency as a tertiary invader, crowding out the secondary invaders, and was of special importance in cases of long duration. Staphylococcus and *M. catarrhalis* made their appearance toward the end of the epidemic and to some extent modified the pathology.

Tuberculosis and Irritable Heart.—No evidence has been found by King that there exists more than accidental relationship between irritable heart and pulmonary tuberculosis.

Extract Nitrogen in Tissues.—The data offered by Foster are neither complete nor conclusive. The evidence at hand simply supports an inference that has always been made, namely, that retained nitrogen cannot be retained exclusively in the blood. There seems also a possibility that disturbances of protein metabolism is a characteristic of nephritis generally, and that difference with types of nephritis are differences only of degree.

Boston Medical and Surgical Journal

Aug. 14, 1919, **181**, No. 7

Mental Hygiene in School. H. M. Pollock, Albany, N. Y.—p. 193.
Treatment of Pruritus Ani By Ionic Medication. W. A. Rolfe, Boston. —p. 196.
Souvenirs of a Medical Student's Life in Paris a Long While Ago. B Robinson, New York.—p. 199.
*A Neurologic Syndrome Constant or Frequent in Psychopathoses Which Is Not Described in Literature. C. J. Enebuske, Boston.—p. 201.

A Neurologic Syndrome.—Three symptoms—increased cerebrospinal tension, increased maximum radialis arterial tension and toxemia, are discussed by Enebuske as the syndrome of dyshydrocephalotony, dysarteriotony and toxemia. He discusses the clinical course of these cases in detail.

Bulletin of Johns Hopkins Hospital, Baltimore

August, 1919, **30**, No. 342

*Formation of Single Ovum Twins. G. L. Streeter, Washington.—p. 235.
*Changes in Skin Sensitiveness to Tuberculin During Epidemic Influenza. A. L. Bloomfield and J. G. Mateer, Baltimore.—p. 238.
*Hemorrhage into a Postscarlatinal Cervical Abscess; Ligation of Common Carotid; Recovery. T. M. Rivers.—p. 240.
*Analysis of Cerebrospinal Fluids of Cats with Meningeal Infections. L. D. Felton, U. S. Army.—p. 242.

Horace Green and His Probang. W. S. Miller, Madison.—p. 246.
Correlation of Roentgen Ray Findings and Physical Signs in Chest In Uncomplicated Epidemic Influenza. A. L. Bloomfield and C. A. Waters, Baltimore.—p. 252.
Dr. George Peirce. J. H. M. Knox, Jr.—p. 254.

Formation of Single Ovum Twins.—Streeter suggests that a careful search at the placental attachment of the umbilical cord would frequently reveal the presence of minute epithelial vesicles the remains of stunted twins, showing that the tendency toward twinning in man is even greater than is now supposed.

Changes in Skin Sensitiveness to Tuberculin During Epidemic Influenza.—During the recent epidemic of influenza Bloomfield and Mateer were struck by the remarkably low leukocyte counts encountered even in mild or ambulatory cases. This suggested that at least some of the reactive processes of the body were in abeyance. It seemed of interest, therefore, to study skin sensitiveness in this disease. The present report deals with the results of cutaneous tuberculin tests in nineteen consecutive cases of epidemic influenza. The diagnosis was based on the symptoms, the presence of hyperemic phenomena of the skin and mucous membranes, the character and duration of the febrile reaction, and the leukopenia. Most of the cases were mild and the disappearance of the skin reaction was therefore in no way associated with general collapse. Three of the patients developed bronchopneumonia, but all made uneventful recoveries. None of them showed clinical signs of active tuberculosis. Old tuberculin was used. Two drops were placed on the forearm about 5 cm. apart. Linear scarification with a dull scalpel was done through the drops of tuberculin after a control scratch had been made distal to them. The tuberculin was allowed to dry on the arm. The tests were all made by the same observers and read at one, two and three days intervals, the character and extent of the redness and induration being noted. Tests were done during the febrile stage and after the temperature had become normal. Skin sensitiveness to tuberculin was absent in every case but one, both mild and severe, during the febrile stage. During convalescence reactivity returned in 89.4 per cent. of the cases, which corresponds to what one would expect in a group of normal individuals of the same age. The return to maximum reactivity was gradual in most cases, as shown by successive tests. In two patients a positive skin test was not obtained during the period of observation, even after the temperature had been normal for from six to eight days.

Hemorrhage Into Postscarlatinal Cervical Abscess.—Following a severe attack of angina, diagnosed as diphtheria by the attending physician, a diffuse, dull, red macular papular rash appeared. The patient was considered by her physician to have nephritis following diphtheria and thus came under Rivers' care. Part of the tonsil, soft palate and posterior pillar on the right side had sloughed, leaving a ragged hole lined with greenish white pus. The glands on both sides of the neck were enlarged. There was a mass the size of a lemon, deeply situated below the angle of the jaw on the right side, that was obscurely fluctuating and was obviously an abscess. The cervical abscess was opened by means of a small puncture and at least 2 ounces of pus were obtained from which a hemolytic streptococcus was grown. The patient seemed to be doing well for three days, when she was found in a large pool of blood, exsanguinated, pulseless and gasping for breath. The bleeding had stopped spontaneously and the wound was not disturbed. There were two hemorrhages in the morning of the following day. At 1 p. m. blood began to spurt from the wound. The resident surgeon enlarged the incision into the abscess and found an erosion of the lingual and external carotid arteries and of the internal jugular vein and that the hemorrhage was from these three sources. A ligature was placed around the common carotid artery and the bleeding from the internal jugular was controlled by packing. There was sugar in the urine for one week after the operation, but the blood sugar was always normal. The patient developed generalized edema, insensibility to pain, waxy flexibility, Chvostek's sign, a double Babinski, exaggerated reflexes, double ankle clonus and a distinct loss of memory for recent events. Gradually she improved. The wound healed slowly under treatment. Rivers calls attention to the fact that adenitis with abscess formation, especially about the neck, is one of the complications of scarlet fever.

Analysis of Cerebrospinal Fluids of Cats with Meningeal Infections.—A method is given by Felton for the measurement of protein in the cerebrospinal fluid. It has been found to be of as great value in acute meningeal infections as the Pandy or Ross Jones tests in differentiating the cerebrospinal fluid of normal cats from those with chronic lesions in the central nervous system. It is simply a Micro-Esbach, consisting in the precipitation of the protein of 1 c.c. of cerebrospinal fluid in a small graduated tube by means of 0.8 c.c. of Tsuchiya's regent. The test is described in detail.

California State Journal of Medicine, San Francisco

August, 1919, **17**, No. 8

Medical Profession "After the War." C. Van Zwalenburg, Riverside, Calif.—p. 267.
Prostitution in Its Relation to Public Health in San Francisco. W. C. Hassler.—p. 270.
*Treatment of Hay Fever by Alcoholic Injection. D. H. Trowbridge, Fresno, Calif.—p. 275.
Children's Year in California. A. Brown, San Francisco.—p. 276.
Unsatisfactory Results Following Noninfected Finger Injuries in Industrial Accidents with Special Reference to Amputations. R. W. Harbaugh, G. F. Helsley and C. H. Hensley.—p. 278.
Problem of Woman Venereal Disease Carrier. E. M. Watters, San Francisco.—p. 284.
Treatment of Gonorrhea and Syphilis in Women. W. E. Stevens, and M. Heppner, San Francisco.—p. 287.
Obstetric Situation in France Today. T. Coffey, Los Angeles.—p. 289.
Perforation in Gastric and Duodenal Ulcers. Case Reports. J. H. O'Connor, San Francisco.—p. 293.
Treatment of Diphtheria Carrier, with Special Reference to Tonsillectomy and Adenoidectomy. Report of Cases. F. E. Detling, Los Angeles.—p. 295.
Use of Homatropin in Refraction. P. Sumner, San Francisco.—p. 296.

Treatment of Hay-Fever by Alcoholic Injection.—Trowbridge injects 95 per cent. alcohol directly into the turbinate, also into the sides of the septum. The treatment is somewhat painful, even though the nasal cavity has been anesthetized thoroughly. There is no pain at the entrance of the needle but on the injection of the alcohol into the tissues the patient complains of considerable pain for a few moments at each injection, provided the alcohol is properly injected. Several injections should be made on each side, considerable reaction following the treatment, lasting from two to seven days. Relief from the sneezing is usually immediate. Trowbridge usually prescribes an antiseptic spray to relieve the congestion.

Delaware State Medical Journal, Wilmington

April, May and June, 1919, **10**, No. 2

Building a Hospital Over Night. J. M. Stadter, Wilmington.—p. 4.
Socialistic Subjugation of the Medical Profession. W. P. Cunningham, New York.—p. 8.

Georgia Medical Association Journal, Atlanta

June, 1919, **9**, No. 2

Some Surgical Problems in Surgery of Neck. E. G. Jones, Atlanta.—p. 21.
Blood Transfusion As a Therapeutic Measure in Septicemia. W. P. Harbin, Rome.—p. 25.

Journal of Nervous and Mental Diseases, New York and Lancaster, Pa.

June, 1919, **49**, No. 6

*Paralysis of Glossopharyngeal, Pneumogastric and Spinal Accessory Nerves with Cerebellar Symptoms. W. G. Spiller, Philadelphia.—p. 481.
The Dispensary and Psychiatry. M. Osnato, New York.—p. 485.

Paralysis of Glossopharyngeal, Pneumogastric and Spinal Accessory Nerves with Cerebellar Symptoms.—The case reported by Spiller affords evidence of the distinct nuclear representations of the motor supply of the soft palate and larynx and of the rare occurrence of paralysis of the glossopharyngeal and pneumogastric nerves without other cranial nerve palsy, except palsy of the pneumogastric portion of the spinal accessory nerve, and without trauma as a cause. A detailed report of the case is made.

Journal of Immunology, Baltimore

May, 1919, **4**, No. 3

*Effect of Agglutinins. B. Fujimoto, Tokyo.—p. 67.
*Comparative Study of Hemolytic Complement and Antibodies in Oxalated Plasma and Serum. S. Watanabe, Philadelphia.—p. 77.
Method for Production of Homogeneous Suspension of Bacillus Anthracis to be Used in Agglutination Reactions. A. Noble, Detroit. —p. 105.
*Nature of Eclampsia. I. Obata, Tokyo.—p. 111.
*Production of Antihuman Hemolysin. E. B. Vedder, U. S. Army. —p. 141.

Effect of Agglutinins.—The experiments reported by Fujimoto showed that the glycolytic action of the living *B. coli* may be markedly weakened by agglutinin, and that the agglutinin is able so to change the cell membrane of the bacteria that their endoenzyme can permeate it. Neither agglutinin nor hemagglutinin alters the permeability of bacteria and red blood corpuscles for glucose. The resistance of the blood corpuscles to hypotonic solutions is slightly decreased by agglutinin or hemolysin.

Hemolytic Complement and Antibodies.—A method for the collection of plasma is described by Watanabe which has yielded uniform success and simplified this difficult technical problem. This technic involves the use of dried sodium oxalate after a method devised by Meeker, and a paraffined tube. Sodium oxalate in the proportion of 0.001 gm. per cubic centimeter of blood prevents coagulation and does not exert any injurious influence on hemolytic complement or antibodies; in amounts of 0.004 gm. per cubic centimeter of blood sodium oxalate may prove to be anticomplementary. The oxalated plasmas of normal and syphilitic persons and normal and immunized rabbits contains hemolytic complement in the same or somewhat greater amounts than the corresponding serums. The oxalated plasmas of syphilitic persons contain the same amounts of Wassermann antibody as the corresponding serums. The oxalated plasmas of persons and rabbits contain the same or occasionally slightly greater amounts of such natural antibodies as antisheep hemolysin and typhoid agglutinin as the corresponding serums. The oxalated plasmas of normal and immunized rabbits contain as much specific and nonspecific complement fixing substances and specific bacterial and hemagglutinins as the corresponding serums. The general conclusion reached by Watanabe is that hemolytic complement and natural and immune antibodies exist free and performed in the circulating plasma of the blood.

Nature of Eclampsia.—Obata's investigation showed that in its capacity to neutralize the poisonous action of placental extract the serum of eclamptic women is much inferior to that of normal individuals, whether male or female, and that the normal capacity of the serum, in this respect, is restored, in eclamptic women, on the fourth or fifth day after labor. The investigation showed also that this abnormality of the serum in eclampsia is not brought about by the convulsion itself. Furthermore, not only has a marked resemblance been pointed out between the symptoms produced with the placental extract and those of the eclamptic attack, but an almost perfect agreement has been found between the anatomic features of eclampsia and those of the animals which were killed by repeated injections of placental extract. From these facts Obata feels justified in drawing the conclusion that the true nature of eclampsia is nothing other than an intoxication by the placental poison which is made possible by a weakening in its normal capacity of neutralization on the part of the maternal blood.

Production of Antihuman Hemolysin.—Vedder has found that the hemolysin is either a globulin or is precipitated with the globulins; more probably the former hypothesis is correct for the total hemolytic power of a serum is contained in the globulins whether precipitated out by salting or by dialysis. In this case, therefore, an antigen consisting of a specific albumin produces an antibody consisting of a specific globulin.

Laryngoscope, St. Louis

July, 1919, **29**, No. 7

Rhinophyma. G. N. New, Rochester.—p. 391.
Two Cases of Abducens Paralysis Occurring in Acute Suppurative Otitis Media with Mastoiditis. O. Stickney, Atlantic City.—p. 395.
Blood Examinations in Surgery of Nose and Throat. S. Oppenheimer and M. J. Gottlieb, New York.—p. 400.
Definite Solution of Stammering Problem. E. Tompkins, Los Angeles. —p. 409.
Voice and Vocal Projection. J. J. Levharg, New York.—p. 419.
Surgical Treatment of Cancer of Tonsil, With a Report of Cases. J. McCoy, New York.—p. 422.
Case of Fulminating Ethmoiditis with Metastasis. I. Frank, Chicago. —p. 424.
Malignant Tumor of Larynx; Operation By Direct Laryngoscopy. J. W. Jervey, Greenville, S. C.—p. 428.
Brain Abscess Drain. A. Kahn, New York.—p. 430.

Medical Record, New York

Aug. 16, 1919, **96**, No. 7

*Apical Tuberculosis and Orthograde Postude; An Hypothesis to Account for Apex of Lung as Locus of Incipient Pulmonary Tuberculosis. W. F. R. Phillips, Charleston, S. C.—p. 265.
Maloney Method in Treatment of Ataxia. M. Grossman, New York. —p. 268.
Abuse of Catharsis and Laxatives in Infancy and Childhood. L. Fischer, New York.—p. 275.
Tuberculosis Regimen. J. B. Huber, New York.—p. 278.
Case of Repeated Toxemias of Pregnancy. L. F. Herz, New York. —p. 279.
Dermatoses of the War. H. MacCormac, London.—p. 280.

Apical Tuberculosis and Orthograde Posture.—The hypothesis formulated by Phillips may be stated thus: In the assumption of the orthograde posture, gravity causes the bulk of the blood of the pulmonary circulation to flow through the lower portions of the lungs; the capillaries of these portions are filled to a certain degree of overdistention, while the capillaries of the upper portions, particularly the apexes, are but meagerly filled with blood and their walls are more or less collapsed; the resultant being that conditions are produced which afford opportunity for the lodgment and development of the tubercle bacillus in one or more ways. As a lemma to this hypothesis, if under the hydrostatic conditions imposed on the circulatory mechanism by the assumption of the upright posture the organism is able to maintain a certain minimum circulation through the apexes of the lungs, apical tuberculosis will not develop, and, as a corollary, pulmonary tuberculosis as a primary disease will not occur. However, Phillips says, this hypothesis should not be taken too rigorously, because we must admit that there is still question as to just where it is essentially a lesion of the pulmonary parenchyma or an extension by way of the lymphatics from the lymphatic glands, or by the blood stream from these glands, or from some other primary locus elsewhere, and, finally, whether there is any locus of the lungs more peculiarly susceptible to tuberculosis than another.

Missouri State Medical Association Journal, St. Louis

August, 1919, **16**, No. 8

Osteosarcoma; Roentgen-Ray Treatment. E. B. Knerr, Kansas City. —p. 251.
Ureteral Calculi. C. E. Burford, St. Louis.—p. 255.
Recurrent Vomiting in Young Children. E. Moody, Joplin, Mo.—p. 257.
Frequency and Characteristics of Functional Heart Murmura. F. B. Kyer, Kansas City, and J. E. Benjamin, Cincinnati.—p. 258.
Case of Lethargic Encephalitis in Later Months of Pregnancy. O. Putnam, Marceline, Mo.—p. 260.
Effect of Castration on Female. W. Kerwin, St. Louis.—p. 261.
Removal of Foreign Bodies from Cornea and Treatment to Prevent Ulceration. E. J. Jennings, St. Louis.—p. 263.

New York Medical Journal

Aug. 16, 1919, **110**, No. 7

Mechanism and Psysiologic Action of Motor Reeducation. P. Kouindjy, France.—p. 265.
Experience in an Evacuation Hospital. E. Eliot, Jr., New York.—p. 268.
*Nature of Neurocirculatory Asthenia. E. P. Boas, New York.—p. 273.
Gunshot Injuries of Head. K. W. Ney, New Orleans.—p. 275.
Mechanical and Physiologic Considerations in Tonsillectomy. H. C. Masland, Philadelphia.—p. 277.
Neurosyphilis. P. Goldfader, Brooklyn.—p. 278.
Universal Health Laws. H. Greenstein, New York.—p. 284.
Early Diagnosis of Pulmonary Tuberculosis. A. Minnig, Denver. —p. 286.

Neurocirculatory Asthenia.—Among soldiers and civilians one frequently encounters persons with congenital, often hereditary nervous instability. This, Boas continues, may manifest itself in different ways, giving what may be called

a cardiovascular, a gastro-intestinal, a mental and a respiratory syndrome. These patients are unable to withstand unusual strains or stresses, be they physical or mental. In children one meets a similar condition in orthostatic albuminuria. It is essential to recognize the close interrelationship of these symptom complexes, and their occurrence in unstable individuals, who often conform to a distinct body type.

Psychobiology, Baltimore

July, 1917, **1**, No. 1

*Retention of Habits by Rat After Destruction of Frontal Portion of Cerebrum. S. I. Franz and K. S. Lashley, Baltimore.—p. 3.
*Action of Some Opium Alkaloids on Psychologic Reaction Time. D. I. Macht and S. Isaacs, Baltimore.—p. 19.
*Cerebral Motor Control: The Recovery from Experimentally Produced Hemiplegia. R. Ogden and S. I. Franz, Washington, D. C.—p. 33.
Effect of Delayed Feeding on Learning. J. B Watson, Baltimore—p. 51.
Internal Secretion in Learning. K. Dunlap, Baltimore.—p. 61.

Retention of Habits by Rat After Partial Decerebration.—The question propounded by Franz and Lashley and which led to making the experiments reported in this paper, viz., Do rats retain habits of recent formation after the destruction of certain cerebral regions? is answered in the affirmative. Rats were taught to ramble through a simple maze and then portions of the anterior cortex were removed surgically. Later the rats were placed in the maze and their actions noted. It was found that the rats which were not overtrained required 29 per cent. less time for the first fifteen trials after the destruction of the frontal lobes and made 53 per cent. fewer errors than they did in learning the maze. This in itself is evidence for a partial retention of the habit. In fact, as a whole, the experiments show that in the white rat the removal of large parts of the frontal portions of the brain does not greatly interfere with a learned reaction. The authors regard this as being the more remarkable since it seems probable that the so-called motor area is in that region and that in most, if not all, of the cases there was a destruction or abolition of the motor connections. While it cannot be concluded with certainty, yet it seems likely that the motor derangements which were exhibited by many of the rats were due to the interference with the normal efferent impulses and not to the general anemia (from the hemorrhage of the operation). Some of the animals also showed obvious disturbances of sensibility, the observations indicating that in some the stimuli to the vibrissae and olfactory stimuli did not give normal effects. In view of the importance of these two forms of sensibility in the rat's reactions, the authors are led to wonder whether these retain their predominance in the animal's learned activities, or are replaced by other forms of sensibility, such as the general kinesthetic. Although the results give plain evidence of noninterference (relative, to be sure) with learned reactions when the frontal portions of the brain have been destroyed they also suggest that the habit reaction is not necessarily cortical in these animals.

Action of Opium on Psychologic Reaction Time.—The experiments reported on by Macht and Isaacs were made on twelve normal subjects. They used morphin sulphate, narcotin hydrochlorid, narcophin and pantopon or pantopium. They found that the effect of morphin alone and in combination with other opium alkaloids depends on the dose used and may be manifested by a change in the mean reading, a change in the mean variation of the readings, or by both of these; and in case of association tests, by the number of errors made in performing a mathematical calculation. After small doses of morphin, there is generally a primary stage of stimulation or quickened reaction time; this may or may not be followed by a secondary stage of depression, as indicated by narcosis and prolongation of the reaction time. After larger doses of morphin, the primary stimulation stage is very short and may be overlooked, whereas the secondary stage or stage of depression is predominant. From the experiments made with combinations of morphin with other opium alkaloids in the form of narcophin and pantopon, it appears that morphin given in such a form is more narcotic and correspondingly more depressant to the psychic functions than when the same dose of morphin is administered to the same subject by itself.

Cerebral Motor Control.—Seven cases of hemiplegia produced artificially by Ogden and Franz in four animals were treated in different ways in order to determine some of the conditions favorable to the recovery of voluntary motor, one experiment shows that motor recovery after the production of an hemiplegia does not result if the animal is left to its own devises. Even though the animal be prevented from using the sound (unparalyzed) segments there is little difference in the improvement from that in which no treatment is given unless in addition to the limitation of the possibility of movement there be added some extra stimulation to the muscles and nerves of the paralyzed side, although the recovery is rapid in such a case if treatment by muscle stimulation and nerve vibration be directed to the involved parts and if special stimulation exercises be given to the animal which will provoke the animal to move the paralyzed segments. The method of treatment recommended by neurologists, general massage, does produce a slight amount of improvement but not to an extent to enable the animal to use the arm and hand properly for such ordinary operations as feeding and climbing, although these activities may be carried out after such treatment in an awkward manner. When, however, efforts are directed to the special nerves and muscles, and when the sound side of the animal is restrained so that movements of climbing and feeding must be made, if at all, by the use of the paralyzed segments, the improvement is rapid and the recovery is practically complete. One fact that stands out prominently is that recovery from the hemiplegic state may be very rapid. The results of these experiments also suggest a reconsideration of the whole problem of cerebral motor control and especially that of cortical motor control.

September, 1917, **1**, No. 2

Continuous Stimulations Versus Transitional Shock in Phototactic Response. S. J. Holmes, Berkeley.—p. 65.
*Effects of Cerebral Destruction on Habit Formation and Retention in Albino Rat. K. S. Lashley and S. I. Franz, Baltimore.—p. 71.
Effect of Strychnin and Caffein on the Rate of Learning. K. S. Lashley, Baltimore.—p. 141.
Stop Watch and Association Test. K. Dunlap, Baltimore.—p. 171.

November, 1917, **1**, No. 3

Motor Functions of Cerebral Cortex of Cat. J. D. Stout, Washington, D. C.—p. 177.
Relative Values of Reward and Punishment in Habit Formation. J. D. Dodson, Minneapolis.—p. 231.

Cerebral Function in Partially Decerebrated Rats.—Rats were trained after destruction of various parts of the cerebral cortex, including the frontal, temporal, parietal, and a large part of the orbital surfaces and the influence of the cerebral destruction on their ability to form and retain kinestheticmotor habits was tested. Lashley and Franz found that the habit of turning correctly in the simple maze may be retained after the destruction of any part or all of the cortex lying in front of and above the knee of the corpus callosum and after the destruction of any part of the temporal and parietal regions. The maze habit may be acquired after the destruction of all the cortex included within these areas, and after the destruction of one, perhaps both, of the striate nuclei. The more complex habits involved in opening an inclined plane box are retained after destruction of the temporal regions of the cortex. The complete destruction of the frontol regions of the cortex results in the loss of the inclined plane box habit. The partial destruction of the frontal region does not abolish this habit. So long as the destruction of the frontal pole is not complete the habit is retained, apparently irrespective of what part of the frontal region has been destroyed. No marked motor disturbances appear after the complete destruction of the stumilable areas of the cortex but in certain cases marked hemiparesis seemed to result from the destruction of the corpus striatum.

West Virginia Medical Journal, Huntington

August, 1919, **14**, No. 2

Victory Meeting of the A M. A. W. W. Golden, Elkins, W Va.—p. 48.
Nursing Situation in West Virginia. J. A. Guthrie, Huntington.—p. 54.
Venereal Disease Problem. F. F. Farnsworth, Charleston, W. Va.—p. 56.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Tuberculosis, London

July, 1919, **13**, No. 3

*Ministry of Health in Relation to Tuberculosis. R. C. Wingfield.—p. 108.
Work of American Commission for Prevention of Tuberculosis in France. Rockefeller Foundation. W. C. Klotz.—p. 112.
Coordination of Measures for Prevention and Treatment of Tuberculosis. J. M. Martin.—p. 119.
Care of Tuberculous Children. W. Aston.—p. 124.

Tuberculosis and Ministry of Health.—A plan is suggested by Wingfield by which special attention would be given to tuberculosis. The ministry of health will naturally be the supreme head and should contain a section to deal with tuberculosis, and nothing but tuberculosis, though its own work overlaps that of other sections, thus providing unity of command for tuberculosis and cooperation of the tuberculosis campaign in the general public health scheme. A suggested outline of the governing body of the tuberculosis section would be: administrator, the chairman; financial adviser; medical adviser, who should be the chairman of an advising committee selected from working officers elected in rotation, holding office one, two or three years; and social adviser, to be the chairman of an advising committee selected from working officers elected in rotation, holding office one, two or three years. Having satisfactorily constituted the central governing body, the work and responsibility should be decentralized, and placed on the shoulders of decentralized units. The decentralized until should be: (A) Tuberculosis officer; aftercare worker; nursing staff. (B) Sanatorium officers; aftercare worker; nursing staff. The units must be uniform all over the country. Local homes for advanced cases must be attached to each unit. Homes for the dying are needed, but they need not be definitely local. Working colonies should be provided and placed under the care of the local unit. The important point is that there should be sufficient numbers of these establishments, if they are to be of practical value to the whole scheme. And, arising from this, it seems certain that this or any other scheme will be useless unless hospital and sanatorium beds in ratio to the number of patients are provided before the scheme is introduced to the public.

British Medical Journal, London

July 26, 1919, **2**, No. 3056

*Hospitals for Treatment of Pulmonary and Other Forms of Tuberculosis. A National Need. H. B. Shaw.—p. 97.
*Eclampsia: Its Prevention and Treatment. A. L. Smith.—p. 101.
Dental Conditions at An Antenatal Clinic. J. W. Ballantyne.—p. 103.
Action of Syphilis on Native Complement. B. H. Shaw.—p. 105.
*Ankylostomiasis in London. C. H. Warner—p. 105.

Hospitals for Tuberculosis.—Shaw pleads for greater facilities for the hospital care of tuberculous patients and for the establishment of institutions, invalid homes, where those patients who are rendered incapable may be nursed and treated until they are fit to earn their living or until they die. Such institutions being in the heart of populous centers, and not buried in the country, will allow these invalids to be near their families, without being a burden to them. The opportunities for the study of the disease will be greatly enhanced, and the need for the discovery of better methods of treatment than the present will be better advertised. There will develop quite a definite body of nurses who have been trained in tuberculosis. A saner view will be held about the dangers of contracting the disease by contact, and nurses will not shun the work. The rich who do not wish to send their tuberculous relatives from their homes will be enabled to secure the help of these nurses for home treatment. The scheme would make no attack on the present plan of providing sanatoriums for the poor, or for the rich. Shaw says that to the cry "decent homes for the poor" must be added "decent permanent hospital accommodation for those who are laid aside by pulmonary tuberculosis or any other disease which has reached an incurable stage."

Eclampsia.—In the treatment of eclampsia Smith says that cesarean section performed by an experienced operator is one of the safest operations in surgery for the mother, and that it enormously increases the chances for the child, if performed after the end of the seventh month when the child is viable. The best time to operate is before labor begins and before the woman has been examined by an ungloved hand. There must be three doctors and a good trained nurse if every patient is to be saved. If the proper conditions cannot be obtained at her home, it is better to send her to a good obstetric surgeon at a good hospital.

Ankylostomiasis in London.—Warner records a case of ankylostomiasis in a subject who has neither been abroad nor resided in a mining district. The patient had never been out of England, nor had he visited Cornwall or any other mining district; he had not, in fact, traveled farther from London than Dover. The boy had, however, associated to a considerable extent with soldiers who had been abroad, and it is possible that he acquired the ankylostoma infection in this manner.

Edinburgh Medical Journal

July, 1919, **23**, No. 1

*Etiology of Cholera. E. D. W. Greig.—p. 4.
Field Ambulance in Gallipoli, Egypt, Palestine and France. J. Young.—p. 23. To be cont'd.

Etiology of Cholera.—The results of Greig's investigations on cholera have been published in the *Indian Journal of Medical Research* (1913) in a series of papers, some of which were abstracted in THE JOURNAL. In this lecture certain aspects of the work are discussed.

Journal of State Medicine, London

July, 1919, **27**, No. 7

Rôle of Ports in Protection of Health of Nation. E. W. Hope.—p. 193.
Infection and Disinfection in War Time. J. M. Beattie.—p. 205.
Social Aspect of Problem of Consumptive in Relation to a Comprehensive Scheme. N. D. Bardswell.—p. 213.

Lancet, London

July 19, 1919, **2**, No. 5003

Spread of Bacterial Infection. W. W. C. Topley.—p. 91.
Cerebrospinal Fever. J. Dorgan.—p. 97.
*Traumatic Rupture of Intestine. W. H. Battle.—p. 103.
Value of Solid Paraffin Wax in Facial Surgery. S. Mort.—p. 105.
*Expectation of Life in Pulmonary Tuberculosis, with Special Reference to Pensions Assessment. R. M. F. Picken.—p. 106.
*Lymphoidocyte and Its Clinical Significance. A. K. Gordon.—p. 108.

Traumatic Rupture of Intestine.—A case of rupture of the jejunum with laceration of the mesentery and intraperitoneal hemorrhage is reported by Battle. The patient was thrown from a bicyle by a van. At operation Battle found a large transverse rupture of the jejunum about 6 inches from the duodenojejunal junction and extending over five-sixths of the circumference of the bowel, there being only a strip of the mucous membrane on the mesenteric aspect which appeared normal. Excision of this part was performed, for a distance of 3 inches above and 3 inches below the rupture, and an end-to-end union made. The boy recovered.

Expectation of Life in Tuberculosis.—According to Picken the expectation of life of males, aged, on the average, 30 years, notified in Glasgow as suffering from pulmonary tuberculosis is about three and one-half years. The expectation of life of males at a sufficiently early stage of the disease to raise hope of recovery is about six and one-half years. The expectation of life of male sanatorium cases discharged with the disease "arrested" is estimated at somewhere about fourteen years. The normal expectation of life of all males in Glasgow at the age of 30 years may be taken as thirty years, but was probably higher for the period covered by this inquiry. The above calculation, applied to the assessment of soldiers and sailors discharged with pulmonary tuberculosis, justifies a minimum assessment of from 50 to 60 per cent., and this should apply to men in whom the disease appears to be arrested for the time being. All cases where the disease is actively progressive, as measured by general signs and symptoms, physical signs, bacteriologic and roentgen-ray examination, should be assessed at 100 per cent. disability. All others, i. e., cases of low activity such

as those of the chronic fibroid type, should be placed in one grade at 70 or 80 per cent. disability.

Lymphoidocyte and Its Clinical Significance.—Gordon is of the opinion that the lymphoidocyte has clinical significance and suggests that it should be looked for in every case as a possible point of value in diagnosis. He has found these cells in the blood of cases of diabetes and cancer but not in influenzal pneumonia or aortic disease.

Archives Mens. d'Obstét. et de Gyn., Paris

January, 1919, **8**, No. 1. Pub'd July, 1919

*History of Obstetrics in France. P. Bar.—p. 3.
*Indications for Medical Abortion. H. Henneberg.—p. 20.
Influenza at Paris Maternity. P. Pellissier.—p. 28.

French Contributions to Obstetrics.—Bar's historical references confirm that podalic version was first placed on a scientific basis by Paré in 1550, cesarean section by Rousset in 1581; the forceps, invented in England, was first made practicable by Levret in 1747, and in 1768-1777 Sigault conceived the idea of and performed an operation to enlarge the pelvis. Scientific embryotomy also dates from Baudelocque, 1829, and Tarnier's forceps, basiotribe and embryotome from the eighties. It was at the Paris Académie de médecine, March 11, 1879, that the alleged multiple causes of puerperal fever were being discussed when Pasteur swept them all aside saying, "Ce qui cause l'épidémie, ce n'est rien de tout cela; c'est la médecine et son personnel qui transportent le microbe d'une femme malade à une femme saine." Hervieux remarked that he did not expect to live to see this wonderful microbe, but Pasteur seized the chalk and drew on the blackboard a streptococcus saying: "Tenez, voici sa figure." Bar adds that there had long been a growing consciousness of the contagiousness of puerperal fever, but Pasteur's four words and chalk drawing brought action, and banished from the world the puerperal epidemics of the past. France also took the lead in welfare work for pregnant women and nursing mothers, and for young children. By instruction of the pregnant and giving a shelter to those in need, an actual science of prophylactic obstetrics has been evolved. Shoulder presentation has p actically disappeared, and eclampsia is very rare. To Budin is due the inauguration of the well baby clinic and systematic prenatal care and instruction, while Roussel put through the law for the protection of young infants. Bar declares that this latter is no longer regarded as a charity, but as a state measure vital for the self-preservation of the nation. The question now is how to lighten for working women the burden of child bearing. This opens a new chapter in the history of obstetrics, and here, too, France is making headway.

Medical Abortion.—Henneberg classifies the eighty-one cases in which abortion was induced as a therapeutic measure during the last twenty-five years at the gynecologic clinic at Geneva. Since 1906 all the women with uncontrollable vomiting have been taken from their environment, isolated and kept on a suitable diet, and in all the tendency to vomiting subsided completely. Consequently this is no longer regarded as calling for induction of abortion. In thirty-one cases the abortion was done on account of pulmonary tuberculosis, in fifteen for heart disease. One woman was becoming blind from choroiditis aggravated by each of her four pregnancies, and the ophthalmologists sent her to the clinic to have a new pregnancy arrested and the woman sterilized.

Bulletin de la Société Médicale des Hôpitaux, Paris

June 13, 1919, **43**, No. 20

*Jaundice Secondary to Influenza. Roussel and de Lavergne.—p. 587.
Influenza. P. Merklen.—p. 590.
*Cardiovascular Symptoms After Gassing. A. Clerc and Rousselot.—p. 593.

Jaundice Secondary to Influenza.—Roussel and Lavergne report five cases of what they call "jaundice from liver-kidney derangement," secondary to an influenzal pneumococcus infection. The pneumococcus was cultivated from the blood even at the height of the jaundice. As we know that bile has a potent bactericidal action on the pneumococcus, we must assume that in this case the jaundice cannot be the result of retention of bile salts but only of the bile pigments.

Cardiovascular Symptoms in the Gassed.—Clerc and Rousselot conclude from this study of 396 *ypérités* that the cardiovascular apparatus does not seem to be primarily nor especially affected by mustard gas during the acute phase of its effect. When the myocardium weakens, it is secondarily, under the influence of the progressive asphyxiation or superposed infection. Sequelae in heart and vessels are rare and insignificant in comparison to the sequelae in the lungs and the condition of attenuated infection which persists so long in the gassed. In the discussion that followed, Rist remarked that emphysema was constant in all the gassed sent to him for his specialist verdict. This emphysema and chemical bronchitis hamper functioning, and are an obstacle to physical work. The ultimate outcome can only be surmised at present. In some there has been no improvement in more than two years to date. The prognosis therefore has to be reserved. He advises temporary discharge from military service with pension calculated on a reduction of 30 or 40 per cent. in the earning capacity. Sergent in examination of more than a thousand gassed soldiers has been impressed with the frequency of emphysema and chronic bronchitis. There is often also a cough like that of whooping cough. There is probably a bronchopulmonary sclerosis responsible for this. Most of such cases are classed as tuberculosis suspects, but tuberculosis seems to be absolutely exceptional in the gassed.

Journal de Radiologie et d'Electrologie, Paris

June, 1919, **3**, No. 6

*Regeneration of Bone Tissue. F. Lemaitre.—p. 241.
*Horizontal Displacement after Fracture. Bailleul and Dubois-Roquebert.—p. 251.
*Surgery at the Evacuation Stations. Drevon and Henri-Petit.—p. 257.
Our Present Knowledge of Roentgen Rays. H. Guilleminot.—p. 263.
Radiography of Pott's Disease. Ménard.—p. 270.
*The Dermographic Pencil. H. Béclère.—p. 272.

Osteogenesis After Wounds of the Head.—Lemaitre declares that among the traditions overthrown by the war is the assumption that the periosteum alone is responsible for the generation and regeneration of bone tissue. This does not occur unless there is a layer of bone along with the periosteum, no matter how thin this layer of bone may be. This *ostéo-périoste* is what can be counted on for growth of new bone in situ, and with pedunculater and free bone-periosteum flaps. He gives an illustrated description of cases in which extensive gaps in the upper or lower jaw and skull grew up completely in time. Similar success was realized in reconstruction of the bony framework of the nose with a bone-periosteum implant from the tibia. Even when healing does not occur smoothly, the graft may regenerate as effectually as under normal conditions. Lemaitre is an otolaryngologist, and his article was read at a conference held by the Vichy American Medical Society which specializes in maxillofacial reconstruction work.

Horizontal Displacement with Fracture.—This title is expressed in the French term *décalage*. It is discussed here in relation to radiography of fracture of the humerus.

Evacuation Surgery.—Drevon and Petit comment on the transformation in the surgery of evacuation as the war went on. At first it was merely a wrapping up and packing on of the wounded men, but soon a complicated system of surgical aid was evolved which he describes in detail.

Dermatographic Pencil.—Béclère relates that just before marking the skin with the paper pencil, he wipes off the spot with a scrap of cotton just dipped into a small tumbler of gasoline which he always has at hand. The pencil then makes a very distinct mark on the skin thus lightly smeared with gasoline, and no pressure is required. He has found this a great help for dermographic outlining in the last two years.

Lyon Chirurgical

January-February, 1919, **16**, No. 1

*Immediate Treatment of War Wounds of the Kidney. L. Thévenot.—p. 1.
War Wound of Pedicle of Kidney. P. Santy.—p. 11.
Extraction of Bullet in Pulmonary Artery. C. Viannay.—p. 14.
*Walking Treatment of Simple Fracture of the Leg. H. Colleu.—p. 18.
Restoration of the Thumb. G. Cotte.—p. 45.
*Regeneration of Bone. G. Duhamel.—p. 56; J. P. Lamare.—p. 58.

*Biology of Bone Grafts. Bonnefon.—p. 62.
Surgical Treatment of Loose Shoulder. R. Massart.—p. 77.
*Infectious Pernicious Anemia. N. Fiessinger, P. L. Wertheimer, and J. Meyer.—p. 89.
Morbid Changes in Trochlea of the Humerus. P. Japiot.—p. 100.

War Wound of the Kidney.—Thévenot remarks that in his three years and a half of work in active sectors at the front he encountered only thirty cases in which the kidney had been injured by a projectile. The outcome in these cases shows that nephrectomy is rarely indicated.

Walking Treatment of Fracture of the Leg.—Colleu refers to the use of Delbet's apparatus that allows the patient to be up and about. He extols it as superior to all other measures when the fracture affects the shaft only. Under other conditions, it should be used extremely cautiously or not at all, unless certain that there is no displacement or diastasis.

Regeneration of Bone.—In Duhamel's case the newly regenerated bone closed in two months a gap of 6 cm. in the shaft of the humerus. The bone tissue extended in width even beyond the shaft, but the shadow of course was not dense. In Lamare's case the gap of 8 cm. in the tibia rapidly grew up with bone tissue. He ascribes great importance to the walking cast, the play of the muscles stimulating repair and modeling the new bone.

Biologic Laws Governing Implants.—Bonnefon's views and experiments were reviewed recently, page 300. He reiterates that regeneration is by no means reviviscence.

Pernicious Anemia of Infectious Origin.—In the case described in minute detail the plastic pernicious anemia developed in the course of a suppurating pneumothorax for which the perfringens seemed to be solely responsible, after a shell wound of the chest. The reds dropped from 1,800,000 to 600,000 in six days, with subjaundice, but recovery followed under serotherapy, which arrested the infection, plus operative draining of the focus.

Paris Médical

July 12, 1919, **9**, No. 28

*Normal Alimentary Glycosuria. A. Gilbert and A. Baudouin.—p. 29.
*Diet in Nephritis. A. Lemierre.—p. 34.
*Auscultation of Venous Pulse. M. Perrin and G. Richard.—p. 40.

Normal Alimentary Glycosuria.—Gilbert and Baudouin describe some minor points which have to be observed in testing the urine for sugar, or else the normal content in carbohydrates may prove misleading. For example, the precipitation of creatinin is not instantaneous; it is better to wait for an hour before filtering. They report comparative tests with various technics. In young and normal subjects the sugar content of the urine showed very little increase after ingestion of even large amounts of sugar, never surpassing 0.50 gm. If 1 gm. or more is found, this may be regarded as a sign that the assimilation of sugar is more or less defective. Even minimal hyperglycosuria of this kind may reveal slight disturbance in the metabolism, and hence the importance of a technic of precision to disclose it. The carbohydrates in the urine are complex, not merely sugar alone. They think that the pentoses form most of the reducing substances; the reducing fermentable fraction is not glucose. The best we can do at present is to accept the global figure of the carbohydrates.

Diet in Nephritis.—Lemierre remarks that the discovery of the harmfulness of salt in certain forms of nephritis is one of the most surprising discoveries of recent years. Patients with extreme edema, such as used to be pitilessly restricted to a milk diet over long periods now are seen to improve and thrive under Widal and Javal's menu yielding 1,500 calories. It is made up of 200 gm. bread made without salt; 200 gm. raw meat; 250 gm. potatoes; 50 gm. sugar, and 30 centiliters each of wine and coffee.

With dry uremia, in distinction to uremia with dropsy, Achard and Paisseau recommend a menu containing 50 gm. meat; 200 gm. potato; 100 gm. rice and 50 gm. butter, representing 1,030 calories. If there is no abnormal retention of salt, it is unnecessary to restrict the intake of salt. The intake of water should never be less than 1.5 liters as the kidney may not be able to eliminate the urea unless it is well diluted; the polyuria therefore is necessary. In acute nephritis there is retention of all the elements of the urine, and hence substances that produce these elements must not be taken, while water should be given freely to flush the kidneys. Nothing but water should be allowed, but some of it may be sweetened or flavored with fruit juices; "the sugar affords a few calories while not giving the kidney a molecule to eliminate." The restriction to water should be maintained along with local and general bloodletting, cold enemas and purgatives until the *débâcle polyurique* sweeps out the urea and chlorids that have been retained.

Auscultation of Venous Pulse.—Perrin and Richard describe the most effectual technic for this and interpretation of the findings. They urge that every practitioner should familiarize himself with such procedures and not content himself with regarding admiringly from afar the cardiologic studies of the day. The contraction of the auricle is manifested in the jugular pulse wave as (*a*) corresponding to the first jugular vein sound on auscultation and the upper third of the ascending line in the oscillometer tracing of the humeral pulse. The contraction of the ventricle (*c*), the second vein sound and the peak of the oscillometer line correspond to the apex beat, while the beginning of the diastole (*v*) corresponds to the third vein sound and the lower third of the descending oscillometer line. The record is thus obtained with the eye, the ear, the oscillometer and the hand (apex beat).

Presse Médicale, Paris

July 10, 1919, **27**, No. 39

*Cancer of Body of Uterus of Placental Origin. F. Jayle and I. Halpérine.—p. 381.
*Roentgen Examination of Tuberculosis Suspects. G. Détré.—p. 384.
*Electric Treatment of Degenerated Muscles. H. Laugier.—p. 385.
*Symptomatology with Transverse Section of the Spinal Cord. Deniker.—p. 386.

Cancer of Body of the Uterus.—Jayle and Halpérine prefer this term instead of "chorio-epithelioma," "syncytioma" or other terms which are confusing to all except histologists. These cancers are peculiarly liable to sudden and profuse hemorrhage and to metastasis. Their illustrated description of the structure explains these two tendencies. In a case reported there was evidence of inherited syphilis.

Roentgen Examination of Tuberculosis Suspects.—Détré found in 80.2 per cent. of the 844 soldiers sent to him as suspects that the assumption of tuberculosis was not sustained by the roentgen findings. In these 676 negative cases, the bacteriologic findings were always concordant. The apex shadow frequently looked opaque and grey, but it cleared up and kept clear when the man coughed. By having the subject lean forward or to one side, the second interspace comes into view when otherwise it is hidden by the shadow of the clavicle. In some of the cases with positive findings they need not necessarily be of a tuberculous nature. In 40 per cent. of the positive cases there was a pleural reaction at the base. Some of the cases also presented the findings characteristic of hilum tuberculosis with a glandular focus, such as has recently been described in children. Three illustrations show the typical findings.

Electric Treatment of Degenerated Muscles.—Laugier remarks that the degenerated fibers become so irresponsive to the electic current that, in order to act on them, such strong currents have to be used that the sound muscle fibers suffer from them. This can be avoided by using a weak current and only very slowly increasing its strength. By this means the degenerated muscles are acted on electively. The degree of inexcitability of a muscle fiber is determined by what he calls the *chronaxie*, that is, the interval before the muscle fibers respond to the stimulus. For example, the muscle in the foot of a snail is a slow muscle, with high *chronaxie*, while the gastrocnemius in the frog is a rapid muscle, with low *chronaxie*. If a very slowly increasing current is sent through these two muscles, the snail muscle will contract while the frog muscle will not. It is thus possible to apply the electric stimulus electively to the degenerated muscle fibers while keeping it below the threshold for the sound muscle fibers. He describes mechanical means to control the current to keep it of this slowly increasing type.

One way is to apply to the electrode condensers which retain the current so that it does not reach the electrode in full strength until after the condensers have been charged, and they can be varied at will.

Transverse Section of Spinal Cord.—Deniker outlines the new symptomatology of transverse section of the spinal cord as it has developed during the war.

Progrès Médical, Paris

June 28, 1919, **34**, No. 26

*The Lessons Learned from the War on Treatment of the Wounded. R. Dupont.—p. 249.
Case of Pseudobulbar Paralysis. Laignel-Lavastine.—p. 254.
Spa Treatment of Neuroses. Macé de Lépinay.—p. 256.

Treatment of the Wounded in the War.—Dupont traces the evolution of the treatment of the wounded through the first two years of the war, when every one was trying to improve on the old methods. "The French," he says, "finally succeeded in transforming the whole treatment of wounds and obtaining results hitherto undreamed of. Excision as soon as possible, followed by primary or secondary suture, cured the wounded so fast and so completely that the undersecretary of state for the Army medical department said that we had carried on the war with our wounded (*nous avions fait la guerre avec nos blessés*). The glorious year was thus 1916; the following years merely witnessed the perfecting of this method which is essentially French."

Revue de Médecine, Paris

March-April, 1919, **36**, No. 2

*Sensory Localization in the Cortex. H. Piéron.—p. 129.
Complications of Influenza. L. Bouchut.—p. 158.
*Pneumococcus False Tuberculosis. Lorrain, Hanns and Gillet.—p. 173.
Slow Endocarditis. R. Debré.—p. 199. To be cont'd.
Asthenia plus Mania after Shell Concussion. R. Benon and G. Lerat.—p. 244.
Edema of the Brain; Recovery after Craniectomy. A. Courjon and R. Didier.—p. 252.

Cortical Sensory Centers.—Piéron tabulates the details of twenty-one cases of war wounds of the skull with cortical anesthesia. His table confirms that certain skin sensory phenomena have exact separate centers or a special region in the cortex. The sensations of pain, temperature and deep pressure are modified last. He discusses in detail the sensory rôle of the cortex, the separation of sensory and motor centers, the sensory representation in the cortex of different segments of the surface of the body, and the proportional representation of the different forms of sensation and perception.

Pneumococcus Pseudotuberculosis.—Lorrain and his coworkers describe seven cases in which the diagnosis of pulmonary tuberculosis seemed certain, and the symptoms dragged along for months, but the sputum did not show tubercle bacilli, and conditions finally returned to clinically normal. The congestion of the lungs and the bronchopneumonia passed through an acute phase and then into an interminable subacute phase, without complete defervescence, dragging along for months without any very pronounced signs on auscultation. The subject does not feel sick enough to stay in bed, but he looks badly until he takes a turn for the better and throws off the whole. The focus of congestion may be at the apex, simulating acute tuberculosis. Or there may be a lobar or pseudolobar focus at the base, suggesting the bronchopulmonary form of tuberculosis or cheesy pneumonia. Or there may be some old healed tuberculous lesion along with the recent sequelae of bronchopneumonia. Careful auscultation will reveal that the lesion at the apex keeps stationary, and that the lesion at the base or in the middle of the lung is growing smaller. The recent history of some pneumococcus affection will then give the clue in some cases, but in others nothing but the absence of tubercle bacilli clears up the diagnosis. The benefit from general treatment has long been lauded. Hirtz urges treatment as for actual tuberculosis, with supervision of the functioning of the diaphragm, possibly belting the lower chest to thrust down the abdominal viscera. Radiotherapy has also been advocated to aid in the healing of pneumonia with incomplete resolution. Several pages of bibliographic references are given, classified by prolonged or relapsing pneumonia, prolonged congestion, nontuberculous protracted fevers, pseudotuberculosis of nasal origin, and association of pneumonia and tuberculosis.

Correspondenz-Blatt für Schweizer Aerzte, Basel

July 3, 1919, **49**, No. 27

The Campaign Against Nonindicated Abortions. Meyer-Rüegg.—p. 985.
*Transfusion of Blood. G. Hotz.—p. 992.
Influenza. K. Frey.—p. 1006.
Hemorrhage in Yellow Spot in Parturients. J. Strebel.—p. 1013.

Transfusion of Blood.—Hotz traces the history of transfusion of blood back to Cardanus' work, published at Basel in 1556, in which he suggested transfusion of blood from a person of good character in the hope to redeem the character of the otherwise hopelessly immoral. The French ambassador at London, he says, was the first to actually practice infusion in man, in 1657. In 1667 cases were reported in which blood from a lamb was infused, with recovery of the apparently moribund patient. Hotz concludes his dissertation on transfusion of blood by commending it as practiced at present as reliable and fully answering its purpose, although we must not in our enthusiasm forget that both for donor and recipient it is a powerful interference in the most intimate and delicate processes of the organism.

Policlinico, Rome

July 6, 1919, **26**, No. 27

*Filtrable Viruses. G. Sampietro.—p. 841.
Neuralgic Angioma. E. Grossi.—p. 849.
Electric Treatment of Laryngeal Disease in the Eighteenth Century. G. Bilancioni.—p. 854.
Benzin in Examination of Typhoid Stools. L. Urizio.—p. 855.
Circulatory Disturbances in Influenza. A. Fortunato.—p. 856.

Filtrable Viruses.—Sampietro remarks that about fifty different kinds of filtrable viruses have been described, although not all of them have been subjected to rigorous tests. Pasteur suggested in 1881 that the virus of rabies must be beyond the scope of our bacteriologic technic, and Sanarelli in 1898 proved that the virus of myxomatous infection in the rabbit was not modified by passing through porcelain that filtered out the smallest bacteria then known. Some spirilla, cocci and spirochetes pass through certain filters but they can be seen with the dark field microscope. The preferable classification of the viruses seems to be in three groups: the ultramicroscope viruses; those with filtrable phases in the life cycle of microscopic parasites, and the actually filtrable bacteria and protozoa. A further classification is in filtrable viruses transmitted by insects, probably of protozoan nature; filtrable viruses of spirochete nature, and those of certain or presumed bacterial nature. He discusses each of these groups, specifying the viruses that belong to each and the relations between them and other bacteria.

The experiences in the recent epidemic of influenza have combined with other findings to sweep away as untenable the hitherto prevailing assumptions in regard to the nature and behavior of the filtrable viruses, so that science is all at sea again with nothing to anchor to at present. The only facts that seem to be established to date are that there is some connection between filtrable viruses and cell inclusions; that certain filtrable viruses form one phase of the life cycle of some protozoa; and that certain bacteria have been found which will actually pass through porcelain. Another fact which seems to be well established is that the extreme contagiousness and wide diffusion of certain infectious diseases are the work of a filtrable virus, but associated bacteria are responsible for the characteristic symptoms and the pathologic anatomy. These associated bacteria he calls "etiologic binomes," and ascribes immense importance to them as they are what determines the characteristic picture of the nosologic entity, while the filtrable virus is responsible for the contagiousness and the diffusibility of the infection.

June 15, 1919, **26**, Surgical Section No. 6

*Resection of Pylorus. O. Tenani.—p. 185.
Immediate Treatment of Gushot Wounds of Joints. E. Bussa-Lay.—p. 191.
Bone Cysts. B. Polettini.—p. 204. Cont'n.

Resection of Pylorus.—Tenani gives the details of a technic for resection of the pylorus which he has applied in two cases, and lauds as being free from the drawbacks of other methods. It provides for the normal course of the bile and pancreatic juice. This is accomplished by mobilizing the stump of the duodenum after the posterior gastro-enterostomy and resection of the pylorus; then this stump is sutured end-to-side to the efferent loop of the jejunum, a short distance below the point of the gastro-enterostomy. To mobilize the duodenum requires releasing the whole of it from the parietal peritoneum and the duodenorenal peritoneum. The latter is incised the entire length of the second portion of the duodenum, and the gastrohepatic omentum is also incised. The duodenum can then be pushed over to the median line and the stump brought down to the proper point. This brings the duodenum away from the danger zone of the vena cava, and the head of the pancreas and the common bile duct come with it. To ensure the correct slant to the duodenal stump so that the bile and pancreatic juice will have free outlet, he lifts up and sutures the duodenum to the stomach, at a point beyond the mouth of the bile duct. The lips of the incision in the mesocolon are fastened to the posterior wall of the stomach around the gastro-enterostomy opening. This technic, he says, wards off danger of perforation of the duodenal stump, and the physiologic course of the bile and pancreatic juice is restored, aided by gravity instead of forcing them to climb up the afferent loop. They also are poured out into the bowel only as the chyme is passed along. His success in his two clinical cases confirms the practical value of these theoretical premises. The article is not illustrated.

Annaes Paulistas de Med. e Cir., S. Paulo

March, 1919, **10**, No. 3

*Treatment of Diphtheria at São Paulo. J. de Toledo Piza.—p. 49.

Treatment of Diphtheria.—Toledo Piza pleads for larger doses of antitoxin than those generally used, his tabulation of the cases of diphtheria at S. Paulo in the last ten years showing a constant decline in the death rate as the doses were progressively increased. In the nonoperative cases, the mortality in the last two years was only 2.4 and 2.8 per cent. although the number of cases has progressively increased, from sixty-four in 1910 to 490 in 1918. In the sixty-six operative cases, the mortality was 34.8 per cent. but omitting those who died within twenty-four hours, it was only 17.3 per cent. The antitoxin should be given both by intramuscular and subcutaneous injection. In the graver cases a third should be injected by the vein. In mild and moderate cases 10,000 or 20,000 units may suffice but in the graver cases 25,000 or 30,000 must be injected. The whole amount is injected at practically the same time, and he would not hesitate to inject up to 35,000 units in very grave cases. Fractioning the doses is annoying to the patient and is less effectual than the large single dose.

Archivos Brasileiros de Medicina, Rio de Janeiro

March, 1919, **9**, No. 3

*Effects of Radioactivity on the Blood. A. da Silva Mello.—p. 123.
*Abortive Treatment of Syphilis. Z. Goulart.—p. 138.
*Suprarenal Asthenia. J. M. da Fonseca.—p. 149.

Effects of Radioactivity on the Blood and Blood-Producing Organs.—Mello remarks that Senn's announcement in 1904 that he had cured myelogenous leukemia with roentgen exposures was spoken of at first by nearly every writer on the subject as a typical *bluff americano*. Even with all the research since, we know but little more of the true significance of the influence of radioactivity on the blood, the importance of the destruction of these formidable masses of leukocytes, and the significance of the prolonged leukopeny which is a manifestation of radioactive poisoning. The experimental research in this line has been done with doses far larger than are ever used therapeutically. The effects are so fulminating that no conclusions can be drawn from them to aid in treatment, but we have learned that the blood system is extremely susceptible to radioactivity. Even one brief roentgen examination may induce leukocytosis. The lymphatic follicles of the spleen and intestine wall are so sensitive that even five seconds of exposure to a capsule containing 20 mg. of Ra B may induce serious changes in the cells.

These and other facts cited emphasize the necessity for systematic reexamination of blood during roentgen or radium treatment. The degree of leukopeny is an index of the intensity of radiotherapeutic action as it affects the inmost recesses of the blood producing organs. Mello's own research with thorium X showed that the leukocytes might disappear completely from the peripheral circulation and the weight rapidly run down while the reds might persist apparently unmodified in structure or numbers to the animal's death. The blood-producing organs showed, simultaneously, violent destructive processes and processes of normal repair. When the dose used was too large, in man or animals, there was liable to be violent diarrhea as the thorium is eliminated in part through the bowel. Another important feature of the effect of radioactivity is the serious tardy disturbance that may follow the subsidence of a tumor under radiotherapy. Absorption of the tumor masses poisons the whole organism, the patient cured of his tumor but dying from the cure or at least suffering from chronic intoxication.

The progress in averting superficial lesions from radiant energy now enables us to focus our attention on the possible internal injury therefrom, but very little has been published in regard to chronic injury of this kind, and scarcely anything on chronic injury of the blood-producing system. The most important feature of the latter is that the lesions of this system are not usually produced by the direct action of the radioactive substance. Some of the animals in his research showed no signs of leukopeny, anemia and loss of weight from the chronic intoxication, but a second injection of the radioactive substance—even a minute amount—brought on serious manifestations and speedy death. This could not be explained by cumulative action, as the animals long since had eliminated the thorium X, and as thorium X loses all its radioactive properties in about four days.

He often found hyperplasia of the bone marrow accompanying the leukopeny, and hence the latter cannot be regarded as a sign of destructive processes in the blood-producing organs. The reds and the hemoglobin content may be apparently normal even with pronounced leukopeny, and they may regenerate normally after venesection although the organism may be suffering severely from the chronic intoxication left by the radioactive substance, as evidenced by the extreme leukopeny and emaciation. An animal stands the toxic action of thorium X better after it has been bled several times; it may even increase in weight, instead of the otherwise almost inevitable loss in weight. The fact that the reds keep at the normal figure is due to stimulated production, as the reds are unquestionably destroyed under the influence of the radioactivity. The spleen plainly shows the exaggerated destruction of reds, and the pigmentation from this was noted in the spleen even when there was no anemia, confirming the superproduction of reds which conceals the massive destruction going on.

With the chronic intoxication, the spleen showed also regressive changes, but when there was associated infection, the spleen seemed to retain its normal structure or showed myelogenous transformation. This is especially interesting in view of the brilliant success that may be obtained by raying the spleen, especially in cases of myelogenous leukemia. Similar changes in the spleen have been observed in patients after raying of tumors, but the changes in the spleen have always been ascribed hitherto to toxic action from the tumor, and their true significance has been overlooked. Mello emphasizes that it is the salts of radium which have the most pronounced influence on the red corpuscle system, but there is a great difference between the various salts in this respect. For example, thorium X has a much stronger action on the myelogenous than on the lymphatic system; exactly the opposite of the roentgen rays, which act almost explosively on lymphatic tissues. The leukopeny under thorium X is mainly a reduction in the cells of medullary origin, that is, the polymorphonuclears, while the lymphocytes increase relatively in numbers. With the roentgen rays it is the lymphocytes which are electively destroyed.

This explains why in lymphatic leukemia thorium X may induce improvement for a time, but the hyperplasia of the bone marrow and the progressive anemia and the lesions encountered in the spleen amply explain the appearance of the refractory phase. After a series of apparently successful applications there is no further response, and the leukemia continues its fatal course. Mello's work with thorium X was done mainly at Berlin in 1915.

Abortive Treatment of Syphilis.—Goulart says that three unmistakable cases of reinfection after abortive treatment of syphilis have convinced him of the actual efficacy of modern treatment of this disease. He gives the details of those cases and treatment, and also of eight other cases in which the cure seems complete but there has been no reinfection.

Suprarenal Asthenia.—Da Fonseca presents an array of evidence to prove that the muscular weakness in certain conditions is the result of insufficiency of the suprarenal medulla and entire chromaffine system, and only secondarily of the suprarenal cortex. Epinephrin therefore is the treatment par excellence.

Archivos Españoles de Pediatría, Madrid

May, 1919, **3**, No. 5

*Treatment of Congenital Talipes Varus Equinus. P. Borobio y Díaz. —p. 257.
*Spengler's Immune Bodies in Treatment of Tuberculosis in Children. C. S. de los Terreros.—p. 263.
*The Rachitic Penis. V. Juaristi.—p. 286.

Congenital Pes Varus.—Borobio insists that this deformity, which is always accompanied with more or less equinus deformity, is amenable only to surgical measures. If they are applied early, all that is necessary is the Phelps-Kirmisson operation. He describes it in detail as he has applied it in 25 cases. In 16 the deformity was bilateral. All but 8 of the 25 children were boys. Perfect correction of the deformity is impossible, but this realizes all that at present it is possible to attain. He advises against wasting time on nonsurgical measures, as the relative correction possible to be realized grows more and more difficult with delay.

Spengler's Immune Bodies in Treatment of Tuberculosis in Children.—De los Terreros has given the I. K. treatment a thorough trial over four years in treatment of 12 children with various forms of tuberculosis. The results were good in 6; medium in 3, and the disease continued a progressive course in the other 3, 2 of the children dying. The outcome was better the earlier the stage and the older the child. The children seemed to bear the injections perfectly but it is impossible to say whether any have been absolutely cured.

Signs of Rachitis.—Juaristi's further observation has confirmed his statement of three years ago that the eyes of rachitic children are rounder than normal, and show more of the sclera. This is the result of changes in the bony framework behind. He now calls attention to another sign of rachitis, from the same cause, some anomaly in the bone. The child's pubis and abdominal wall slant forward different from the normal aspect, the suspensory ligament is relaxed, and the vascular elements are hypotonic, the result being that the flaccid penis sags low, straight and long.

Crónica Médica, Lima

May, 1919, **36**, No. 671

*Mechanism of Therapeutic Action of Iodid in Hyperthyroidism. H. F. Delgado.—p. 155.
*Serodiagnosis of Typhus. R. E. Ribeyro.—p. 158.
Another Case of Relapsing Fever. C. A. Zevallos.—p. 160.
Bullet in Atlas Ligament. F. Quesada.—p. 164.
*Expert Testimony in Murder Case. G. Fernandez Dávila.—p. 168.
Pathologic Anatomy of the Lymphatic Gland. O. Hercelles.—p. 177.

Iodids with Hyperthyroidism.—Delgado relates that he has obtained excellent results from the use of potassium iodid in certain cases of hyperthyroidism. Whatever the mechanism of its action, the fact of the efficacy of potassium iodid in his cases was established beyond question, and he urges others not to be withheld by their prejudices from its use with hyperthyroidism. In the especially striking case reported, the exophthalmos, tachycardia and enlargement of the thyroid, with hallucinations and distress, had developed after a period of emotional stress and financial worry. Delgado applied psychotherapy and gave daily 4 gm. of potassium iodid, and in two days nearly all the symptoms had disappeared.

Serodiagnosis of Typhus.—Ribeyro reports that in the seven cases of typhus he has encountered, all the serums agglutinated the proteus X without exception, using a strain obtained from Paris. The range was from 1:100 to 1:10,000. Serum from guinea-pigs infected with typhus did not induce agglutination, and the tests were constantly negative with serum from nontyphus patients.

Medicolegal Report on Murder Case.—Dávila's illustrated report was completed in 1915 but he did not care to publish it before, having waited until the courts had finished with the case. The victim was General Varela, minister of war and premier of Peru at the time, shot while asleep.

Crónica Médico-Quirúrgica, Havana

February, 1919, **45**, No. 2

*Subconjunctival Injection of Cocain. J. Santos Fernández.—p. 55.
Some Medical Aspects of the War. F. M. Fernández.—p. 64.

Subconjunctival Injection of Cocain for Cataract and Glaucoma Operations.—Santos Fernández says that these operations can be done without subconjunctival injection of cocain, but if one wishes to omit nothing that will aid in rendering the operation a success, this is certainly to be recommended. He injects 0.005 gm. of morphin half an hour before the operation and repeats it after the operation, as it is very important to keep the patient in a tranquil frame of mind. To aid in this he does not set a day for the operation, but keeps speaking of preliminary things that have to be done, and the operation can then be performed whenever most convenient and without apprehension on the patient's part.

Revista Médica de Chile, Santiago

May, 1919, **47**, No. 5

*Anti-Anaphylaxis and Anti-Allergy Treatment. R. Kraus.—p. 191.
Case of Banti's Disease. E. González Cortes.—p. 212.
*Dangers of Retrograde Cholecystectomy. Vargas Salcedo.—p. 217.

Anaphylaxis, Allergy and Treatment.—Kraus reviews the history of these conceptions and of treatment based on efforts to combat the allergy. The list includes his own heterobacteriotherapy, autoserotherapy of hemoglobinuria, horse serum in treatment of hemophilia, peptone protein therapy according to Nolf, and the use of peptone in asthma—all these are instances of the modification of the allergic processes by heterogenous substances. Another manifestation of the same principle is the modification of leukemia and certain tumors and psychoses by intercurrent infections. Wagner's attempt to influence general paralysis with tuberculin is another effort in this line.

Technic for Cholecystectomy.—Vargas Salcedo discusses the possible dangers of retrograde cholecystectomy and tells how to avoid them. By lifting up the liver we see the triangle formed by the cystic and hepatic ducts and the right lobe of the liver. The two ducts usually run parallel here for a short distance, and a ligature thrown around the cystic duct here may by mistake include the hepatic also. In about 30 per cent. of all cases the cystic duct empties into the hepatic duct at the opposite side, at the rear or at the front, and in about 2 per cent. it slants upward to it. The arterial supply of the cystic duct is also frequently abnormal, two cystic arteries being found in about 20 per cent. For these and other reasons cited he advises to ligate the cystic duct close to the gallbladder, leaving only a stump 1 or 2 cm. long. The advantages of the retrograde technic are obvious when we have a clear view of this triangle of Budde, as we then can detect any anomalies. But if adhesions, etc., prevent ample oversight of this region, it is a blind and dangerous method. He introduces a short segment of rather hard rubber tubing in anastomosing the bile duct with the duodenum, abandoning this tube to its fate afterward. In a case reported, he inadvertently had included the hepatic duct in his ligature and this had to be corrected at a later operation. The woman

long refused to permit this although the jaundice was intense almost from the first and became greenish by the end of six months, but there was no pruritus nor much weakness although the woman had become much emaciated. The much distended hepatic duct contained 300 gm. of bile. Recovery was smooth after anastomosis between the hepatic duct and the duodenum. The article is illustrated.

Revista de Medicina y Cirugía, Havana

July 25, 1919, **24**, No. 14

*The Surgical Trend in Obstetrics. J. F. Arteaga.—p. 369.

The Surgical Trend in Obstetrics.—Arteaga denounces the separation of gynecology and obstetrics, saying that they belong together and should be taught by the same professor. The best obstetricians are those trained in abdominal diagnosis and abdominal surgery.

Revista Médica del Uruguay, Montevideo

June, 1919, **22**, No. 6

*Classification of Gastro-Intestinal Disturbances in Young Infants. R. Berro.—p. 421.
*Latent Tuberculosis in Children. J. P. Garrahan and L. Iraola.—p. 459.
The Child in the Tuberculous Family. R. Iribarne.—p. 466.
Prophylaxis of Child Abandonment. A. Turenne.—p. 469.

Classification of Gastro-Intestinal Disorders in Infants.—Berro quotes the various classifications that have been proposed by different authors, and shows their defects. His own classification separates first the breast and bottle fed. Then the disorders in the bottle fed are classed in three groups according as the food, an infection, or the constitution is involved. The constitution may show a neuropathic, spasmophilic, exudative or hemorrhagic tendency, and the food may be inadequate in quality or quantity or the food may be in excess. The disorders from overfeeding may be acute or chronic; with the acute form there is dyspepsia or intoxication, while the chronic form entails athrepsia, atrophy or hypotrophy. With infection there is gastro-enteritis acute, subacute or relapsing; or else there is enterocolitis, and this may be simple, dysenteriform, dysenteric or secondary. His chart thus shows the sequence and the logical indications for treatment. He concludes with an appeal for the promotion of breast nursing, saying that nothing can replace the mother's breast and the mother's heart, and reiterating that the infant has an inalienable right to its mother's breast.

Frequency of Latent Tuberculosis in Children.—Garrahan and Iraola examined 1214 children from poorer homes and in two orphan asylums at Buenos Aires, and found that 75 per cent. of the children, even though apparently healthy, responded positively to tests for tuberculosis. The proportion of positive responses was 20 per cent. less among the children who had lived all or part of their life in the asylum than among the children who lived at home.

Siglo Médico, Madrid

May 17, 1919, **66**, No. 3414

*Solutions of Sodium Citrate. R. Luis y Yagüe.—393.
*Dangers of Iodin Internally. Id.—p. 394.
*Milk in Colitis. Id.—p. 394.
*Bismuth with Gastric Ulcer. Id.—p. 394.
*Diarrhea and Arsenic Treatment. Id.—p. 395.
Causal Indications according to the Crasis or Constitution. C. Calleja.—p. 395. Cont'n.
*White Swelling in Children. Alvarez-Sierra.—p. 397.
Mercurial Stomatitis, etc. Sicilia.—p. 398.
Influenza in Toledo District. C. Martín y González.—p. 399.

Preparation of Solutions of Sodium Citrate.—Luis warns that pharmacists have been known to dispense sodium bicarbonate plus citric acid instead of the sodium citrate ordered. This is particularly harmful for patients with hyperchlorhydria as it adds more acid to the stomach contents, and may explain certain failures in treatment.

Iodin Internally.—Luis has noted that iodin taken internally seems to cause gastro-intestinal disturbance in those who at some time in the past have had hyperchlorhydria or gastric ulcer. In others it induces rebellious diarrhea. Iodin has been commonly used of late as a preventive of influenza, but it is too dangerous taken internally, he declares, saying that he knows of cases in which it was evidently responsible for gastric ulceration. It should never be given internally without investigating the gastro-intestinal past of the patient, and anything suggesting trouble of this kind, no matter how slight, contraindicates its use by the mouth. It should never be taken on an empty stomach, and the doses should be moderate and the effect supervised.

Milk in Colitis.—Luis remarks that milk is often ordered on account of the hyperchlorhydria which frequently accompanies the colitis. But it has been his experience that patients with colitis do not thrive on milk. It is liable to entail sensations of oppression, flatulence and colic, but usually without diarrhea, the tendency being toward constipation. It is better to refrain from milk in colitis, he says, but if it has to be given, there is less disturbance when it is associated with starch in the form of a gruel.

Bismuth in Treatment of Gastric Ulcer.—Luis explains the reasons for his recommendation to give the bismuth on an empty stomach. When digestion is under way and an excess of hydrochloric acid is being secreted, then it is necessary to give alkalines to neutralize this hyperchlorhydria. They should be taken at the height of digestion or at the first twinge of pain as the hydrochloric acid begins to corrode. The bismuth should always be supplemented with an alkali in this way unless we are certain that there is no excess of hydrochloric acid.

Diarrhea and Arsenic.—Luis advises supervision of the bowels when prescribing arsenic in any form or by any route. It should be given very cautiously when there is a tendency to diarrhea, and the drug should be suspended when it seems to derange intestinal functioning, especially in the debilitated. Fowler's solution seems to have the least disturbing influence of any form.

Tuberculous Arthritis of the Knee in Children.—Alvarez-Sierra says that white swelling seems to be becoming increasingly common in children. As tuberculosis is constantly extending its domain, the number of cases of surgical tuberculosis is proportionately increasing and children form the largest contingent in this category. White swelling of the knee is amenable to proper treatment, but the outcome is directly proportional to the stage of the process when treatment is begun. General treatment is the main thing; the surgical measures are merely the adjuvant, he declares. Heliotherapy is transcendent but it must be applied with careful technic, with brief partial exposures at first and finally of the whole body. For continuous extension, celluloid apparatus for immobilization are better than plaster. He denounces the use of the knife, saying that resection or arthrectomy only exceptionally cures a white swelling; it usually prolongs the disease indefinitely, the lesions spread, and the patient develops general tuberculosis. If the lesions are very deep and there is extensive suppuration, he advises amputation as this avoids the danger of septicemia, metastasis and amyloid degeneration of the viscera, and promptly restores the patient to his normal life. In the early stage, a medical plan of skilful intensification of the organic defense may cure, but the outcome with resection is extremely dubious. If operation is decided on, it should be an amputation and a very radical one.

Mitteilungen a. d. med. Fakultät. d. k. Univ. Tokyo

February 5, 1918, **19**, No. 2. Rec'd June, 1919

*Thymus Functioning. S. Shimidzu.—p. 165.
*Tetragenus Sepsis. T. Tokikuni and S. Tominaga.—p. 213.
*Arrythmia with Beriberi. S. Kato and S. Yamada.—p. 229.
*Electrocardiographic Study of Action of Drugs on Heart. S. Sakai.—p. 245.

Thymus Functioning.—This is Shimidzu's second report of research on thymus functioning. He discusses here "thymus immune serum" with special regard to the reciprocal relations between the thymus and the lymph apparatus. His previous research showed that the thymus immune serum entailed atrophy of the thymus and interfered with the normal development of the animals. His further experiments have confirmed the close conection between the thymus and the lymph apparatus as a whole. He suggests that the con-

dition known as the status thymicolymphaticus may be directly traced to some early acquired injury of the thymus.

Tetragenus Sepsis.—The woman of 31 showed *Tetragenus albus* and *aureus* in blood, joint effusion, skin and mucosa ulcerations and in the urine, but she recovered completely in two months. The first symptoms were noted three months after the birth of her first child: ulceration in mouth and on the genitals. No benefit was derived from antistreptococcus serum, but sodium salicylate seemed to hasten the recovery.

Arrhythmia with Beriberi.—In the two cases reported with diagrams by Kato and Yamada, the arrhythmia did not develop until during convalescence, as the skin symptoms were improving. The arrhythmia was of the sinusal type, and seemed to be due to vagotony.

Electrocardiographic Study of Action of Drugs on Heart.—Sakai gives a number of electrocardiograms of the surviving mammalian heart under the influence of strophanthus, digitalis, and other heart stimulants. Spartein invariably checked in all directions the functioning of the surviving heart. Caffein, theobromin and theocin all alike accelerated the pulse, but theobromin had a depressing action on the conduction of the impulse, while caffein and theocin stimulated it.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

May 17, 1919, **1**, No. 20

Case of Auricular Flutter, Heart Block and Arrhythmia. W. C. Aalsmeer.—p. 1733.
Case of Air in Frontal Sinus. C. E. Benjamins.—p. 1741.
Echinococcus Disease in the Netherlands. A. B. van Deinse.—p. 1746.
*Multiple Sclerosis. H. Bolten.—p. 1749.

Multiple Sclerosis.—Bolten discusses the signs and symptoms of incipient multiple sclerosis as the prognosis is so important, especially at this stage. In the eight cases with an unusually early clinical picture which he reports various types are represented. In one case, a healthy man of 40 fell on his knees during a fencing bout, and spastic paresis developed. By the end of the fifth month there was nystagmus, with other signs of multiple sclerosis. Bolten accepts this disease as the outcome of a congenital inferiority of the central nervous system, the same as paralysis agitans and spastic spinal paralysis. The fact that the nervous system is below standard does not become apparent until, spontaneously or from some external factor, infection, trauma or emotional shock, the unstable balance is upset. The clinical picture then resulting may vary within a wide range. One young man presented for months symptoms of a brain tumor, including double optic neuritis, right deafness and right trigeminal phenomena, the reflexes abolished, but the pulse, mind and stomach were behaving normally. The progress of the case confirmed the diagnosis of multiple sclerosis although the roentgen findings still suggest a possible tumor as first assumed. In another case the man of 50 had presented spastic spinal paralysis for ten years before other symptoms of the multiple sclerosis became apparent. One woman of 34 had complained of dizziness for seven years but nothing could be found to explain it. The dizziness became worse on turning the head, lying down, and in the dark, and sometimes was so severe that she lost her balance. Finally, other symptoms of multiple sclerosis cleared up the case. In another case a man of 20 developed optic neuritis, with hyperalgesia and attacks of pain followed by briefly transient vesicular erruptions. This peculiar play of symptoms kept up for a year before the multiple sclerosis became apparent. One man of 30 with unmistakable multiple sclerosis for several years became suddenly totally blind. The papillae were blanched on both sides, but after a time vision returned and is now two thirds on both sides. The only symptoms at first in one man, now 37, were hemiparesis and nystagmus on the same side and scanning speech. When the paresis comes on gradually, as in this instance, no tendency to recovery can be anticipated.

Hospitalstidende, Copenhagen

June 18, 1919, **62**, No. 25

*Lumbar Puncture with Abscess in Brain. G. V. T. Borries.—p. 753.

Lumbar Puncture with Abscess in Brain.—Borries has found four different types of cerebrospinal fluid at lumbar puncture with suppurative cerebral and subdural processes. The fluid may be absolutely clear when the abscess is free from complications. The suppurative process may even prove fatal—from respiratory paralysis—without the lumbar fluid ever showing signs of pleocytosis. When the fluid is turbid, this indicates propagated irritation although the leptomeningitis may be minimal and not perceptible to the naked eye. The turbidity is not due to irruption of pus as the fluid may be absolutely sterile. The microscope will always reveal the leptomeningitis in such cases, but it is negligible from the clinical standpoint. Even if the patient succumbs to his cerebral lesion, the leptomeningitis may never have got beyond the microscopic phase. It is possible to distinguish between an uncomplicated diffuse leptomeningitic process in the brain by the behavior of the lumbar puncture fluid. If it retains the characteristics of a benign course, as if the meningitis were on the road to recovery, we may accept the assumption of a brain abscess free from complications. The fluid may grow less and less turbid but no one hitherto has thought of utilizing this as a means to differentiate an abscess from meningitis. This is particularly instructive when we compare the changes in the spinal fluid with the course of the case as a whole; the symptoms from the brain abscess may be growing constantly more severe while the puncture fluid is progressively clearing up. He cites several cases from the literature to show this paradoxic course, and reports a case from his own experience in addition to several he has previously published. The lumbar puncture fluid in this latest case was turbid and contained a few bacteria on the first examination but grew sterile and clearer later although cerebral symptoms persisted and necropsy revealed no macroscopic leptomeningitis. One is liable to be misled by the findings at a single lumbar puncture.

Svenska Läkaresällskapets Handlingar, Stockholm

June 30, 1919, **45**, No. 2

*Acute Leukemia. O. Lindbom.—p. 83.

Acute Leukemia.—Lindbom's monograph on the history, clinical picture and pathologic anatomy of acute leukemia fills 255 pages, including fifteen of bibliographic references and one colored plate. Treatment is discussed in a brief paragraph to the effect that, to date, treatment can be only symptomatic. The differential points between lymphatic and myelogenic leukemia are the nuclear structure of the lymphoid cells in the blood, the oxidase reaction, and the histologic changes in the organs. The appearance of promyelocytes in the blood is no certain sign of the myelogenous type, and enlargement of the thymus is not pathognomonic of the lymphatic form. There is much to sustain the view that leukemia is an infectious disease, a sepsis, although attempts to cultivate the germ and transmit the disease have always failed to date. Abnormally high numbers of leukocytes are not a feature of the disease; there may even be leukopeny. Hence the term leukemia should be banished from scientific writings, he says. The number of leukocytes may vary widely in the same person at different times, so that there is no basis for the term "pseudoleukemia," and the term "leukemia" is misleading. Twenty cases are analyzed in minute detail (155 pages), with tabulation of the daily blood findings under sixteen headings over long periods in several of the cases.

Ugeskrift for Læger, Copenhagen

July 3, 1919, **81**, No. 27

*Influenza Pneumonia in Parturients. E. Petersen.—p. 1097.

Influenzal Pneumonia in Parturients.—Petersen's experience in twenty-three cases with a death rate of 43 per cent. confirms that reported from Germany in respect to the gravity of influenzal pneumonia in labor and the puerperium. Benthin reported in Germany a death rate of 54 per cent. and Ottow 76 per cent. Delivery usually proceeded easily and the best results were obtained in the cases in which delivery was left to nature. The period of expulsion is the most dangerous phase, and any anesthetic seems fraught with special peril in these cases.